



SEQUENCE LISTING

<110> Bell, John C.
Sonenberg, Nahum
Stojdl, David F.
Brown, Earl G.
Atkins, Harold L.
Marius, Ricardo M.
Lichty, Brian D.
Knowles, Shane B.

<120> ONCOLYTIC VIRUS

<130> 18003

<140> US 09/664,444

<141> 2000-09-18

<150> 60/287,590

<151> 1999-09-17

<160> 52

<170> PatentIn Ver. 2.1

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<212> PRT

<213> Artificial Sequence

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<223> Description of Artificial Sequence: Synthetic
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<210> 2

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<213> Artificial Sequence

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<223> Description of Artificial Sequence: Synthetic
peptide

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<210> 3

<211> 11

<212> PRT

<213> Artificial Sequence

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<223> Description of Artificial Sequence: Synthetic peptide

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Cys His Gly Leu His Ser Asn Met Arg His Cys
1 5 10

<210> 4

<211> 9

<212> PRT

<213> Artificial Sequence

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<223> Description of Artificial Sequence: Synthetic peptide

<400> 4

Cys His His His His Arg Leu Asn Cys
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<210> 5

<211> 9

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<213> Artificial Sequence

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<223> Description of Artificial Sequence: Synthetic peptide

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<210> 6

<211> 9

<212> PRT

<213> Artificial Sequence

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<223> Description of Artificial Sequence: Synthetic peptide

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<210> 7

<211> 9

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<223> Description of Artificial Sequence: Synthetic peptide

<400> 7
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<210> 8
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<212> PRT
<213> Artificial Sequence

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<223> Description of Artificial Sequence: Synthetic peptide

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<210> 9
<211> 1269
<212> DNA
<213> Vesicular stomatitis virus

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tccggaaatg tatcaatcat acatgtcaac agctacttgt atggagcatt aaaggacatc 240
cggggtaagt tggataaaga ttgggtcaagt ttcggaataa acatcgggaa agcaggggat 300
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gtatcggatg cttccagaac cagcgcagat gacaaatggg tgcctttgta tctacttggc 420
ttatacagag tgggcagaac acaaatgcct gaatacagaa aaaagctcat ggatgggctg 480
acaaatcaat gcaaaatgat caatgaacag tttgaacctc ttgtgccaga aggtcgtgac 540
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gtcatgtcac tgcaaggcct aagagagaag acaattggca agtatgctaa gtcagaattt 1260
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<210> 10
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<212> DNA
<213> Vesicular stomatitis virus

<400> 10

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gacaaatga 1269
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<210> 11

<211> 1269

<212> DNA

<213> Vesicular stomatitis virus

<400> 11

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tacatcaata ctacaaaaag tttgtcagat ctaagaggat atgtctacca aggcctcaaa 180
tccggaaatg tatcaatcat acatgtcaac agctacttgt atggagcatt gaaggacatc 240
cggggtaagt tggataaaga ttggtcaagt ttcggaataa acatcgggaa ggcaggggat 300
acaatcggaa tatttgacct tgtatccttg aaagccctgg acggtgtact tccagatgga 360
gtatcggatg cttccagaac cagcgcagat gacaaatggg tgcctttgta tctacttggc 420
ttatacagag tgggcagaac acaaatgcct gaatacagaa aaaggctcat ggatgggctg 480
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<210> 12

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<212> DNA
<213> Vesicular stomatitis virus

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tacatcaata ctacaaaaag tttgtcagat ctaagaggat atgtctacca aggcctcaaa 180
tccggaaatg tatcaatcat acatgtcaac agctacttgt atggagcatt gaaggacatc 240
cggggttaagt tggataaaga ttgggtcaagt ttcggaataa acatcgggaa ggcaggggat 300
acaatcggaa tatttgacct tgtatccttg aaagccctgg acggtgtact tccagatgga 360
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gtcatgtcac tgcaaggcct aagagagaag acaattggca agtatgctaa gtcagaattt 1260
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<210> 13
<211> 1029
<212> DNA
<213> Vesicular stomatitis virus

<220>
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<223> "n" represents a, t, c, g, other or unknown

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gacattgagt atacatctcn tactacagca ggtttgttgt acgcttatgc agtaggatcc 780
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<210> 14
 <211> 422
 <212> PRT
 <213> Vesicular stomatitis virus

<400> 14
 Met Ser Val Thr Val Lys Arg Ile Ile Asp Asn Thr Val Ile Val Pro
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 Lys Leu Pro Ala Asn Glu Asp Pro Val Glu Tyr Pro Ala Asp Tyr Phe
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 Arg Lys Ser Lys Glu Ile Pro Leu Tyr Ile Asn Thr Thr Lys Ser Leu
 35 40 45
 Ser Asp Leu Arg Gly Tyr Val Tyr Gln Gly Leu Lys Ser Gly Asn Val
 50 55 60
 Ser Ile Ile His Val Asn Ser Tyr Leu Tyr Gly Ala Leu Lys Asp Ile
 65 70 75 80
 Arg Gly Lys Leu Asp Lys Asp Trp Ser Ser Phe Gly Ile Asn Ile Gly
 85 90 95
 Lys Ala Gly Asp Thr Ile Gly Ile Phe Asp Leu Val Ser Leu Lys Ala
 100 105 110
 Leu Asp Gly Val Leu Pro Asp Gly Val Ser Asp Ala Ser Arg Thr Ser
 115 120 125
 Ala Asp Asp Lys Trp Leu Pro Leu Tyr Leu Leu Gly Leu Tyr Arg Val
 130 135 140
 Gly Arg Thr Gln Met Pro Glu Tyr Arg Lys Lys Leu Met Asp Gly Leu
 145 150 155 160
 Thr Asn Gln Cys Lys Met Ile Asn Glu Gln Phe Glu Pro Leu Val Pro
 165 170 175
 Glu Gly Arg Asp Ile Phe Asp Val Trp Gly Asn Asp Ser Asn Tyr Thr
 180 185 190
 Lys Ile Val Ala Ala Val Asp Met Phe Phe His Met Phe Lys Lys His
 195 200 205
 Glu Cys Ala Ser Phe Arg Tyr Gly Thr Ile Val Ser Arg Phe Lys Asp
 210 215 220
 Cys Ala Ala Leu Ala Thr Phe Gly His Leu Cys Lys Ile Thr Gly Met
 225 230 235 240
 Ser Thr Glu Asp Val Thr Thr Trp Ile Leu Asn Arg Glu Val Ala Asp
 245 250 255

Glu Met Val Gln Met Met Leu Pro Gly Gln Glu Ile Asp Lys Ala Asp
 260 265 270
 Ser Tyr Met Pro Tyr Leu Ile Asp Phe Gly Leu Ser Ser Lys Ser Pro
 275 280 285
 Tyr Ser Ser Val Lys Asn Pro Ala Phe His Phe Trp Gly Gln Leu Thr
 290 295 300
 Ala Leu Leu Leu Arg Ser Thr Arg Ala Arg Asn Ala Arg Gln Pro Asp
 305 310 315 320
 Asp Ile Glu Tyr Thr Ser Leu Thr Thr Ala Gly Leu Leu Tyr Ala Tyr
 325 330 335
 Ala Val Gly Ser Ser Ala Asp Leu Ala Gln Gln Phe Cys Val Gly Asp
 340 345 350
 Asn Lys Tyr Thr Pro Asp Asp Ser Thr Gly Gly Leu Thr Thr Asn Ala
 355 360 365
 Pro Pro Gln Gly Arg Asp Val Val Glu Trp Leu Gly Trp Phe Glu Asp
 370 375 380
 Gln Asn Arg Lys Pro Thr Pro Asp Met Met Gln Tyr Ala Lys Arg Ala
 385 390 395 400
 Val Met Ser Leu Gln Gly Leu Arg Glu Lys Thr Ile Gly Lys Tyr Ala
 405 410 415
 Lys Ser Glu Phe Asp Lys
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<210> 15
 <211> 422
 <212> PRT
 <213> Vesicular stomatitis virus

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 35 40 45
 Ser Asp Leu Arg Gly Tyr Val Tyr Gln Gly Leu Lys Ser Gly Asn Val
 50 55 60
 Ser Ile Ile His Val Asn Ser Tyr Leu Tyr Gly Ala Leu Lys Asp Ile
 65 70 75 80
 Arg Gly Lys Leu Asp Lys Asp Trp Ser Ser Phe Gly Ile Asn Ile Gly
 85 90 95

Lys	Ala	Gly	Asp	Thr	Ile	Gly	Ile	Phe	Asp	Leu	Val	Ser	Leu	Lys	Ala	
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Leu	Asp	Gly	Val	Leu	Pro	Asp	Gly	Val	Ser	Asp	Ala	Ser	Arg	Thr	Ser	
		115					120					125				
Ala	Asp	Asp	Lys	Trp	Leu	Pro	Leu	Tyr	Leu	Leu	Gly	Leu	Tyr	Arg	Val	
	130					135					140					
Gly	Arg	Thr	Gln	Met	Pro	Glu	Tyr	Arg	Lys	Arg	Leu	Met	Asp	Gly	Leu	
145					150					155					160	
Thr	Asn	Gln	Cys	Lys	Met	Ile	Asn	Glu	Gln	Phe	Glu	Pro	Leu	Val	Pro	
				165					170					175		
Glu	Gly	Arg	Asp	Ile	Phe	Asp	Val	Trp	Gly	Asn	Asp	Ser	Asn	Tyr	Thr	
			180					185					190			
Lys	Ile	Val	Ala	Ala	Val	Asp	Met	Phe	Phe	His	Met	Phe	Lys	Lys	His	
		195					200					205				
Glu	Cys	Ala	Ser	Phe	Arg	Tyr	Gly	Thr	Ile	Val	Ser	Arg	Phe	Lys	Asp	
	210					215					220					
Cys	Ala	Ala	Leu	Ala	Thr	Phe	Gly	His	Leu	Cys	Lys	Ile	Thr	Gly	Met	
225					230					235					240	
Ser	Thr	Glu	Asp	Val	Thr	Thr	Trp	Ile	Leu	Asn	Arg	Glu	Val	Ala	Asp	
				245					250					255		
Glu	Met	Val	Gln	Met	Met	Leu	Pro	Gly	Gln	Glu	Ile	Asp	Lys	Ala	Asp	
			260					265					270			
Ser	Tyr	Met	Pro	Tyr	Leu	Ile	Asp	Phe	Gly	Leu	Ser	Ser	Lys	Ser	Pro	
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Tyr	Ser	Ser	Val	Lys	Asn	Pro	Ala	Phe	His	Phe	Trp	Gly	Gln	Leu	Thr	
	290					295					300					
Ala	Leu	Leu	Leu	Arg	Ser	Thr	Arg	Ala	Arg	Asn	Ala	Arg	Gln	Pro	Asp	
305					310					315					320	
Asp	Ile	Glu	Tyr	Thr	Ser	Leu	Thr	Thr	Ala	Gly	Leu	Leu	Tyr	Ala	Tyr	
				325					330					335		
Ala	Val	Gly	Ser	Ser	Ala	Asp	Leu	Ala	Gln	Gln	Phe	Cys	Val	Gly	Asp	
			340					345					350			
Ser	Lys	Tyr	Thr	Pro	Asp	Asp	Ser	Thr	Gly	Gly	Leu	Thr	Thr	Asn	Ala	
		355					360					365				
Pro	Pro	Gln	Gly	Arg	Asp	Val	Val	Glu	Trp	Leu	Gly	Trp	Phe	Glu	Asp	
	370					375					380					
Gln	Asn	Arg	Lys	Pro	Thr	Pro	Asp	Met	Met	Gln	Tyr	Ala	Lys	Arg	Ala	
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Val Met Ser Leu Gln Gly Leu Arg Glu Lys Thr Ile Gly Lys Tyr Ala
405 410 415

Lys Ser Glu Phe Asp Lys
420

<210> 16

<211> 422

<212> PRT

<213> Vesicular stomatitis virus

<400> 16

Met Ser Val Thr Val Lys Arg Ile Ile Asp Asn Thr Val Ile Val Pro
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Arg Lys Ser Lys Glu Ile Pro Leu Tyr Ile Asn Thr Thr Lys Ser Leu
35 40 45

Ser Asp Leu Arg Gly Tyr Val Tyr Gln Gly Leu Lys Ser Gly Asn Val
50 55 60

Ser Ile Ile His Val Asn Ser Tyr Leu Tyr Gly Ala Leu Lys Asp Ile
65 70 75 80

Arg Gly Lys Leu Asp Lys Asp Trp Ser Ser Phe Gly Ile Asn Ile Gly
85 90 95

Lys Ala Gly Asp Thr Ile Gly Ile Phe Asp Leu Val Ser Leu Lys Ala
100 105 110

Leu Asp Gly Val Leu Pro Asp Gly Val Ser Asp Ala Ser Arg Thr Ser
115 120 125

Ala Asp Asp Lys Trp Leu Pro Leu Tyr Leu Leu Gly Leu Tyr Arg Val
130 135 140

Gly Arg Thr Gln Met Pro Glu Tyr Arg Lys Arg Leu Met Asp Gly Leu
145 150 155 160

Thr Asn Gln Cys Lys Met Ile Asn Glu Gln Phe Glu Pro Leu Val Pro
165 170 175

Glu Gly Arg Asp Ile Phe Asp Val Trp Gly Asn Asp Ser Asn Tyr Thr
180 185 190

Lys Ile Val Ala Ala Val Asp Met Phe Phe His Met Phe Lys Lys His
195 200 205

Glu Cys Ala Ser Phe Arg Tyr Gly Thr Ile Val Ser Arg Phe Lys Asp
210 215 220

Cys Ala Ala Leu Ala Thr Phe Gly His Leu Cys Lys Ile Thr Gly Met

225 230 235 240
 Ser Thr Glu Asp Val Thr Thr Trp Ile Leu Asn Arg Glu Val Ala Asp
 245 250 255
 Glu Met Val Gln Met Met Leu Pro Gly Gln Glu Ile Asp Lys Ala Asp
 260 265 270
 Ser Tyr Met Pro Tyr Leu Ile Asp Phe Gly Leu Ser Ser Lys Ser Pro
 275 280 285
 Tyr Ser Ser Val Lys Asn Pro Ala Phe His Phe Trp Gly Gln Leu Thr
 290 295 300
 Ala Leu Leu Leu Arg Ser Thr Arg Ala Arg Asn Ala Arg Gln Pro Asp
 305 310 315 320
 Asp Ile Glu Tyr Thr Ser Leu Thr Thr Ala Gly Leu Leu Tyr Ala Tyr
 325 330 335
 Ala Val Gly Ser Ser Ala Asp Leu Ala Gln Gln Phe Cys Val Gly Asp
 340 345 350
 Ser Lys Tyr Thr Pro Asp Asp Ser Thr Gly Gly Leu Thr Thr Asn Ala
 355 360 365
 Pro Pro Gln Gly Arg Asp Val Val Glu Trp Leu Gly Trp Phe Glu Asp
 370 375 380
 Gln Asn Arg Lys Pro Thr Pro Asp Met Met Gln Tyr Ala Lys Arg Ala
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 405 410 415
 Lys Ser Glu Phe Asp Lys
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<210> 17
 <211> 342
 <212> PRT
 <213> Vesicular stomatitis virus

<220>
 <221> MOD_RES
 <222> (1)..(342)
 <223> "Xaa" represents any, other or unknown amino acid

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35					40					45					
Leu	Asp	Gly	Val	Leu	Pro	Asp	Gly	Val	Ser	Asp	Ala	Ser	Arg	Thr	Ser
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Ala	Asp	Asp	Lys	Trp	Leu	Pro	Leu	Tyr	Leu	Leu	Gly	Leu	Tyr	Arg	Val
65					70					75					80
Gly	Arg	Thr	Gln	Met	Pro	Glu	Tyr	Arg	Lys	Arg	Leu	Met	Asp	Gly	Leu
				85					90					95	
Thr	Asn	Gln	Cys	Lys	Met	Ile	Asn	Glu	Gln	Phe	Glu	Pro	Leu	Val	Pro
			100					105					110		
Glu	Gly	Arg	Asp	Ile	Phe	Asp	Val	Trp	Gly	Asn	Asp	Ser	Asn	Tyr	Thr
		115					120					125			
Lys	Ile	Val	Ala	Ala	Val	Asp	Met	Phe	Phe	His	Met	Phe	Lys	Lys	His
130						135					140				
Glu	Cys	Ala	Ser	Phe	Arg	Tyr	Gly	Thr	Ile	Val	Ser	Arg	Phe	Lys	Asp
145					150					155					160
Cys	Ala	Ala	Leu	Ala	Thr	Phe	Gly	His	Leu	Cys	Lys	Ile	Thr	Gly	Met
				165					170					175	
Ser	Thr	Glu	Asp	Val	Thr	Thr	Trp	Ile	Leu	Asn	Arg	Glu	Val	Ala	Asp
			180					185					190		
Glu	Met	Val	Gln	Met	Met	Leu	Pro	Gly	Gln	Glu	Ile	Asp	Lys	Ala	Asp
		195					200					205			
Ser	Tyr	Met	Pro	Tyr	Leu	Ile	Asp	Phe	Gly	Leu	Ser	Ser	Lys	Ser	Pro
		210				215					220				
Tyr	Ser	Ser	Val	Lys	Asn	Pro	Ala	Phe	His	Phe	Trp	Gly	Gln	Leu	Thr
225					230					235					240
Asp	Ile	Glu	Tyr	Thr	Ser	Xaa	Thr	Thr	Ala	Gly	Leu	Leu	Tyr	Ala	Tyr
				245					250					255	
Ala	Val	Gly	Ser	Ser	Ala	Asp	Leu	Ala	Xaa	Gln	Phe	Cys	Val	Gly	Asp
			260					265					270		
Ser	Lys	Tyr	Thr	Pro	Asp	Asp	Ser	Thr	Gly	Gly	Leu	Thr	Thr	Asn	Ala
			275				280					285			
Pro	Pro	Gln	Gly	Arg	Asp	Val	Val	Glu	Trp	Leu	Gly	Trp	Phe	Glu	Asp
		290				295					300				
Gln	Asn	Arg	Lys	Pro	Thr	Pro	Asp	Met	Met	Gln	Tyr	Ala	Lys	Arg	Ala
305					310					315					320
Val	Met	Ser	Leu	Gln	Gly	Leu	Arg	Glu	Lys	Thr	Ile	Gly	Lys	Tyr	Ala
				325					330					335	
Lys	Ser	Glu	Phe	Asp	Lys										

<210> 18
 <211> 798
 <212> DNA
 <213> Vesicular stomatitis virus

<400> 18
 atggataatc tcacaaaagt tcgtgagtat ctcaagtcct attctcgtct ggatcaggcg 60
 gtaggagaga tagatgagat cgaagcacia cgagctgaaa agtccaatta tgagttgttc 120
 caagaggatg gagtggaaga gcatactaa cctctttatt ttcaggcagc agatgattct 180
 gacacagaat ctgaaccaga aattgaagac aatcaagggt tgtatgcaca ggatccagaa 240
 gctgagcaag ttgaaggctt tatacagggg ccttttagat actatgcaga tgagggaagt 300
 gatgttgtat ttacttcgga ctggaaacca cctgagcttg aatctgacga gcatggaaag 360
 accttacggt tgacatcgcc agagggttta agtggagagc agaaatccca gtggctttcg 420
 acgattaaag cagtcgtgca aagtgcacaa tactggaatc tggcagagtg cacatttgaa 480
 gcatcgggag aaggggtcat tatgaaggag cgccagataa ctccggatgt atataagggtc 540
 actccagtga tgaacacaca tccgtcccaa tcagaagcag tatcagatgt ttggtctctc 600
 tcaaagacat ccatgacttt ccaacccaag aaagcaagtc ttcagcctct caccatatcc 660
 ttggatgaat tgttctcatc tagaggagag ttcatctctg tcggaggtga cggacgaatg 720
 tctcataaag aggccatcct gctcggcctg agatacaaaa agttgtacaa tcaggcgaga 780
 gtcaaatatt ctctgtag 798

<210> 19
 <211> 798
 <212> DNA
 <213> Vesicular stomatitis virus

<400> 19
 atggataatc tcacaaaagt tcgtgagtat ctcaagtcct attctcgtct agatcaggcg 60
 gtaggagaga tagatgagat cgaagcacia cgagctgaaa agtccaatta tgagttgttc 120
 caagaggacg gagtggaaga gcatactagg cctctttatt ttcaggcagc agatgattct 180
 gacacagaat ctgaaccaga aattgaagac aatcaaggct tgtatgtacc agatccgga 240
 gctgagcaag ttgaaggctt tatacagggg ccttttagat actatgcgga tgaggacgtg 300
 gatgttgtat tcacttcgga ctggaaacag cctgagcttg aatccgacga gcatggaaag 360
 accttacggt tgacattgcc agagggttta agtggagagc agaaatccca gtggcttttg 420
 acgattaaag cagtcgttca aagtgcacaa cactggaatc tggcagagtg cacatttgaa 480
 gcatcgggag aaggggtcat cataaaaaag cgccagataa ctccggatgt atataagggtc 540
 actccagtga tgaacacaca tccgtcccaa tcagaagccg tatcagatgt ttggtctctc 600
 tcaaagacat ccatgacttt ccaacccaag aaagcaagtc ttcagcctct caccatatcc 660
 ttggatgaat tgttctcatc tagaggagaa ttcatctctg tcggaggtaa cggacgaatg 720
 tctcataaag aggccatcct gctcggctct aggtacaaaa agttgtacaa tcaggcgaga 780
 gtcaaatatt ctctgtag 798

<210> 20
 <211> 570
 <212> DNA
 <213> Vesicular stomatitis virus

<400> 20
 atggataatc tcacaaaagt tcgtgagtat ctcaagtcct attctcgtct agatcaggcg 60
 gtaggagaga tagatgagat cgaagcacia cgagctgaaa agtccaatta tgagttgttc 120
 caagaggacg gagtggaaga gcatactagg cctctttatt ttcaggcagc agatgattct 180
 gacacagaat ctgaaccaga aattgaagac aatcaaggct tgtatgtacc agatccgga 240

gctgagcaag	ttgaaggctt	tatacagggg	ccttttagatg	actatgcgga	tgaggacgtg	300
gatgttgtat	tcacttcgga	ctggaaacag	cctgagcttg	aatccgacga	gcatggaaag	360
accttacggt	tgacattgcc	agagggttta	agtggagagc	agaaatccca	gtggcctttg	420
acgattaaag	cagtcgttca	aagtgccaaa	cactggaatc	tggcagagtg	cacatttgaa	480
gcatcgggag	aaggggtcat	cataaaaaag	cgccagataa	ctccggatgt	atataaggtc	540
actccagtga	tgaacacaca	tccgtcccaa				570

<210> 21

<211> 798

<212> DNA

<213> Vesicular stomatitis virus

<400> 21

atggataatc	tcacaaaagt	tcgtgagtat	ctcaagtcct	attctcgtct	agatcaggcg	60
gtaggagaga	tagatgagat	cgaagcacia	cgagctgaaa	agtccaatta	tgagttgttc	120
caagaggacg	gagtggaaga	gcatactagg	ccctcttatt	ttcaggcagc	agatgattct	180
gacacagaat	ctgaaccaga	aattgaagac	aatcaaggct	tgtatgtacc	agatccggaa	240
gctgagcaag	ttgaaggctt	tatacagggg	ccttttagatg	actatgcgga	tgaggacgtg	300
gatgttgtat	tcacttcgga	ctggaaacag	cctgagcttg	aatccgacga	gcatggaaag	360
accttacggt	tgacattgcc	agagggttta	agtggagagc	agaaatccca	gtggcctttg	420
acgattaaag	cagtcgttca	aagtgccaaa	cactggaatc	tggcagagtg	cacatttgaa	480
gcatcgggag	aaggggtcat	cataaaaaag	cgccagataa	ctccggatgt	atataaggtc	540
actccagtga	tgaacacaca	tccgtcccaa	tcggaagccg	tatcagatgt	ttggtctctc	600
tcaaagacat	ccatgacttt	ccaacccaag	aaagcaagtc	ttcagcctct	caccatatcc	660
ttggatgaat	tgttctcatc	tagaggagaa	ttcatctctg	tcggaggtaa	cggacgaatg	720
tctcataaag	aggccatcct	gctcgggtctg	aggtacaaaa	agttgtacaa	tcaggcgaga	780
gtcaaatatt	ctctgtag					798

<210> 22

<211> 798

<212> DNA

<213> Vesicular stomatitis virus

<400> 22

atggataatc	tcacaaaagt	tcgtgagtat	ctcaagtcct	attctcgtct	agatcaggcg	60
gtaggagaga	tagatgagat	cgaagcacia	cgagctgaaa	agtccaatta	tgagttgttc	120
caagaggacg	gagtggaaga	gcatactagg	ccctcttatt	ttcaggcagc	agatgattct	180
gacacagaat	ctgaaccaga	aattgaagac	aatcaaggct	tgtatgtacc	agatccggaa	240
gctgagcaag	ttgaaggctt	tatacagggg	ccttttagatg	actatgcgga	tgaggacgtg	300
gatgttgtat	tcacttcgga	ctggaaacag	cctgagcttg	aatccgacga	gcatggaaag	360
accttacggt	tgacattgcc	agagggttta	agtggagagc	agaaatccca	gtggcctttg	420
acgattaaag	cagtcgttca	aagtgccaaa	cactggaatc	tggcagagtg	cacatttgaa	480
gcatcgggag	aaggggtcat	cataaaaaag	cgccagataa	ctccggatgt	atataaggtc	540
actccagtga	tgaacacaca	tccgtcccaa	tcagaagccg	tatcagatgt	ttggtctctc	600
tcaaagacat	ccatgacttt	ccaacccaag	aaagcaagtc	ttcagcctct	caccatatcc	660
ttggatgaat	tgttctcatc	tagaggagaa	ttcatctctg	tcggaggtaa	cggacgaatg	720
tctcataaag	aggccatcct	gctcgggtctg	aggtacaaaa	agttgtacaa	tcaggcgaga	780
gtcaaatatt	ctctgtag					798

<210> 23

<211> 265

<212> PRT

<213> Vesicular stomatitis virus

<400> 23

Met Asp Asn Leu Thr Lys Val Arg Glu Tyr Leu Lys Ser Tyr Ser Arg
1 5 10 15
Leu Asp Gln Ala Val Gly Glu Ile Asp Glu Ile Glu Ala Gln Arg Ala
20 25 30
Glu Lys Ser Asn Tyr Glu Leu Phe Gln Glu Asp Gly Val Glu Glu His
35 40 45
Thr Lys Pro Ser Tyr Phe Gln Ala Ala Asp Asp Ser Asp Thr Glu Ser
50 55 60
Glu Pro Glu Ile Glu Asp Asn Gln Gly Leu Tyr Ala Gln Asp Pro Glu
65 70 75 80
Ala Glu Gln Val Glu Gly Phe Ile Gln Gly Pro Leu Asp Asp Tyr Ala
85 90 95
Asp Glu Glu Val Asp Val Val Phe Thr Ser Asp Trp Lys Pro Pro Glu
100 105 110
Leu Glu Ser Asp Glu His Gly Lys Thr Leu Arg Leu Thr Ser Pro Glu
115 120 125
Gly Leu Ser Gly Glu Gln Lys Ser Gln Trp Leu Ser Thr Ile Lys Ala
130 135 140
Val Val Gln Ser Ala Lys Tyr Trp Asn Leu Ala Glu Cys Thr Phe Glu
145 150 155 160
Ala Ser Gly Glu Gly Val Ile Met Lys Glu Arg Gln Ile Thr Pro Asp
165 170 175
Val Tyr Lys Val Thr Pro Val Met Asn Thr His Pro Ser Gln Ser Glu
180 185 190
Ala Val Ser Asp Val Trp Ser Leu Ser Lys Thr Ser Met Thr Phe Gln
195 200 205
Pro Lys Lys Ala Ser Leu Gln Pro Leu Thr Ile Ser Leu Asp Glu Leu
210 215 220
Phe Ser Ser Arg Gly Glu Phe Ile Ser Val Gly Gly Asp Gly Arg Met
225 230 235 240
Ser His Lys Glu Ala Ile Leu Leu Gly Leu Arg Tyr Lys Lys Leu Tyr
245 250 255
Asn Gln Ala Arg Val Lys Tyr Ser Leu
260 265

<210> 24

<211> 265

<212> PRT

<213> Vesicular stomatitis virus

<400> 24

Met	Asp	Asn	Leu	Thr	Lys	Val	Arg	Glu	Tyr	Leu	Lys	Ser	Tyr	Ser	Arg
1				5					10					15	
Leu	Asp	Gln	Ala	Val	Gly	Glu	Ile	Asp	Glu	Ile	Glu	Ala	Gln	Arg	Ala
		20						25					30		
Glu	Lys	Ser	Asn	Tyr	Glu	Leu	Phe	Gln	Glu	Asp	Gly	Val	Glu	Glu	His
		35					40					45			
Thr	Arg	Pro	Ser	Tyr	Phe	Gln	Ala	Ala	Asp	Asp	Ser	Asp	Thr	Glu	Ser
	50					55					60				
Glu	Pro	Glu	Ile	Glu	Asp	Asn	Gln	Gly	Leu	Tyr	Val	Pro	Asp	Pro	Glu
65					70					75					80
Ala	Glu	Gln	Val	Glu	Gly	Phe	Ile	Gln	Gly	Pro	Leu	Asp	Asp	Tyr	Ala
				85					90					95	
Asp	Glu	Asp	Val	Asp	Val	Val	Phe	Thr	Ser	Asp	Trp	Lys	Gln	Pro	Glu
		100						105					110		
Leu	Glu	Ser	Asp	Glu	His	Gly	Lys	Thr	Leu	Arg	Leu	Thr	Leu	Pro	Glu
		115					120					125			
Gly	Leu	Ser	Gly	Glu	Gln	Lys	Ser	Gln	Trp	Leu	Leu	Thr	Ile	Lys	Ala
130						135					140				
Val	Val	Gln	Ser	Ala	Lys	His	Trp	Asn	Leu	Ala	Glu	Cys	Thr	Phe	Glu
145					150					155					160
Ala	Ser	Gly	Glu	Gly	Val	Ile	Ile	Lys	Lys	Arg	Gln	Ile	Thr	Pro	Asp
				165					170					175	
Val	Tyr	Lys	Val	Thr	Pro	Val	Met	Asn	Thr	His	Pro	Ser	Gln	Ser	Glu
			180					185					190		
Ala	Val	Ser	Asp	Val	Trp	Ser	Leu	Ser	Lys	Thr	Ser	Met	Thr	Phe	Gln
		195					200					205			
Pro	Lys	Lys	Ala	Ser	Leu	Gln	Pro	Leu	Thr	Ile	Ser	Leu	Asp	Glu	Leu
		210				215					220				
Phe	Ser	Ser	Arg	Gly	Glu	Phe	Ile	Ser	Val	Gly	Gly	Asn	Gly	Arg	Met
225					230					235					240
Ser	His	Lys	Glu	Ala	Ile	Leu	Leu	Gly	Leu	Arg	Tyr	Lys	Lys	Leu	Tyr
				245					250					255	
Asn	Gln	Ala	Arg	Val	Lys	Tyr	Ser	Leu							
			260					265							

<210> 25

<211> 190

<212> PRT

•

<213> Vesicular stomatitis virus

<400> 25

```
Met Asp Asn Leu Thr Lys Val Arg Glu Tyr Leu Lys Ser Tyr Ser Arg
 1              5              10              15

Leu Asp Gln Ala Val Gly Glu Ile Asp Glu Ile Glu Ala Gln Arg Ala
      20              25              30

Glu Lys Ser Asn Tyr Glu Leu Phe Gln Glu Asp Gly Val Glu Glu His
      35              40              45

Thr Arg Pro Ser Tyr Phe Gln Ala Ala Asp Asp Ser Asp Thr Glu Ser
      50              55              60

Glu Pro Glu Ile Glu Asp Asn Gln Gly Leu Tyr Val Pro Asp Pro Glu
      65              70              75              80

Ala Glu Gln Val Glu Gly Phe Ile Gln Gly Pro Leu Asp Asp Tyr Ala
      85              90              95

Asp Glu Asp Val Asp Val Val Phe Thr Ser Asp Trp Lys Gln Pro Glu
      100             105             110

Leu Glu Ser Asp Glu His Gly Lys Thr Leu Arg Leu Thr Leu Pro Glu
      115             120             125

Gly Leu Ser Gly Glu Gln Lys Ser Gln Trp Leu Leu Thr Ile Lys Ala
      130             135             140

Val Val Gln Ser Ala Lys His Trp Asn Leu Ala Glu Cys Thr Phe Glu
      145             150             155             160

Ala Ser Gly Glu Gly Val Ile Ile Lys Lys Arg Gln Ile Thr Pro Asp
      165             170             175

Val Tyr Lys Val Thr Pro Val Met Asn Thr His Pro Ser Gln
      180             185             190
```

<210> 26

<211> 265

<212> PRT

<213> Vesicular stomatitis virus

<400> 26

```
Met Asp Asn Leu Thr Lys Val Arg Glu Tyr Leu Lys Ser Tyr Ser Arg
 1              5              10              15

Leu Asp Gln Ala Val Gly Glu Ile Asp Glu Ile Glu Ala Gln Arg Ala
      20              25              30

Glu Lys Ser Asn Tyr Glu Leu Phe Gln Glu Asp Gly Val Glu Glu His
      35              40              45

Thr Arg Pro Ser Tyr Phe Gln Ala Ala Asp Asp Ser Asp Thr Glu Ser
      50              55              60
```


Glu Pro Glu Ile Glu Asp Asn Gln Gly Leu Tyr Val Pro Asp Pro Glu
 65 70 75 80
 Ala Glu Gln Val Glu Gly Phe Ile Gln Gly Pro Leu Asp Asp Tyr Ala
 85 90 95
 Asp Glu Asp Val Asp Val Val Phe Thr Ser Asp Trp Lys Gln Pro Glu
 100 105 110
 Leu Glu Ser Asp Glu His Gly Lys Thr Leu Arg Leu Thr Leu Pro Glu
 115 120 125
 Gly Leu Ser Gly Glu Gln Lys Ser Gln Trp Leu Leu Thr Ile Lys Ala
 130 135 140
 Val Val Gln Ser Ala Lys His Trp Asn Leu Ala Glu Cys Thr Phe Glu
 145 150 155 160
 Ala Ser Gly Glu Gly Val Ile Ile Lys Lys Arg Gln Ile Thr Pro Asp
 165 170 175
 Val Tyr Lys Val Thr Pro Val Met Asn Thr His Pro Ser Gln Ser Glu
 180 185 190
 Ala Val Ser Asp Val Trp Ser Leu Ser Lys Thr Ser Met Thr Phe Gln
 195 200 205
 Pro Lys Lys Ala Ser Leu Gln Pro Leu Thr Ile Ser Leu Asp Glu Leu
 210 215 220
 Phe Ser Ser Arg Gly Glu Phe Ile Ser Val Gly Gly Asn Gly Arg Met
 225 230 235 240
 Ser His Lys Glu Ala Ile Leu Leu Gly Leu Arg Tyr Lys Lys Leu Tyr
 245 250 255
 Asn Gln Ala Arg Val Lys Tyr Ser Leu
 260 265

<210> 27

<211> 265

<212> PRT

<213> Vesicular stomatitis virus

<400> 27

Met Asp Asn Leu Thr Lys Val Arg Glu Tyr Leu Lys Ser Tyr Ser Arg
 1 5 10 15
 Leu Asp Gln Ala Val Gly Glu Ile Asp Glu Ile Glu Ala Gln Arg Ala
 20 25 30
 Glu Lys Ser Asn Tyr Glu Leu Phe Gln Glu Asp Gly Val Glu Glu His
 35 40 45
 Thr Arg Pro Ser Tyr Phe Gln Ala Ala Asp Asp Ser Asp Thr Glu Ser

50	55	60
Glu Pro Glu Ile Glu Asp Asn Gln Gly Leu Tyr Val Pro Asp Pro Glu 65 70 75 80		
Ala Glu Gln Val Glu Gly Phe Ile Gln Gly Pro Leu Asp Asp Tyr Ala 85 90 95		
Asp Glu Asp Val Asp Val Val Phe Thr Ser Asp Trp Lys Gln Pro Glu 100 105 110		
Leu Glu Ser Asp Glu His Gly Lys Thr Leu Arg Leu Thr Leu Pro Glu 115 120 125		
Gly Leu Ser Gly Glu Gln Lys Ser Gln Trp Leu Leu Thr Ile Lys Ala 130 135 140		
Val Val Gln Ser Ala Lys His Trp Asn Leu Ala Glu Cys Thr Phe Glu 145 150 155 160		
Ala Ser Gly Glu Gly Val Ile Ile Lys Lys Arg Gln Ile Thr Pro Asp 165 170 175		
Val Tyr Lys Val Thr Pro Val Met Asn Thr His Pro Ser Gln Ser Glu 180 185 190		
Ala Val Ser Asp Val Trp Ser Leu Ser Lys Thr Ser Met Thr Phe Gln 195 200 205		
Pro Lys Lys Ala Ser Leu Gln Pro Leu Thr Ile Ser Leu Asp Glu Leu 210 215 220		
Phe Ser Ser Arg Gly Glu Phe Ile Ser Val Gly Gly Asn Gly Arg Met 225 230 235 240		
Ser His Lys Glu Ala Ile Leu Leu Gly Leu Arg Tyr Lys Lys Leu Tyr 245 250 255		
Asn Gln Ala Arg Val Lys Tyr Ser Leu 260 265		

<210> 28

<211> 690

<212> DNA

<213> Vesicular stomatitis virus

<400> 28

```

atgagttcct taaagaagat tctcggctctg aaggggaaag gtaagaaatc taagaaatta 60
gggatcgcac cacccttata tgaagaggac actagcatgg agtatgctcc gagcgctcca 120
attgacaaat cctatttttg agttgacgag atggacacct atgatccgaa tcaattaaga 180
tatgagaaat tcttctttac agtgaaaatg acgggttagat ctaatcgtcc gttcagaaca 240
tactcagatg tggcagccgc tgtatcccat tgggatcaca tgtacatcgg aatggcaggg 300
aaacgtccct tctacaaaat cttggctttt ttgggttctt ctaatctaaa ggccactcca 360
gcggtattgg cagatcaagg tcaaccagag tatcacactc actgcgaagg cagggcttat 420
ttgccacata ggatggggaa gaccctccc atgctcaatg taccagagca cttcagaaga 480
ccattcaata taggtcttta caagggaacg attgagctca caatgaccat ctacgatgat 540

```

```

gagtcactgg aagcagctcc tatgatctgg gatcatttca attcttccaa attttctgat 600
ttcagagaga aggccttaaat gtttggcctg attgtcgaga aaaaggcatc tggagcgtgg 660
gtcctggatt ctatcagcca cttcaaatga                               690

```

<210> 29

<211> 690

<212> DNA

<213> Vesicular stomatitis virus

<400> 29

```

atgagttcct taaagaagat tctcggctctg aaggggaaag gtaagaaatc taagaaatta 60
gggatcgcac cacccttcta tgaagaggac actaacatgg agtatgctcc gagcgctcca 120
attgacaaat cctatttttg agttgacgag atggacactc atgatccgca tcaattaaga 180
tatgagaaat tcttctttac agtgaaaatg acggtttagat ctaatcgtcc gttcagaaca 240
tactcagatg tggcagccgc tgtatcccat tgggatcaca tgtacatcgg aatggcaggg 300
aaacgtccct tctacaagat cttggctttt ttgggttctt ctaatctaaa ggccactcca 360
gcggtatttg cagatcaagg tcaaccagag tatcacgctc actgtgaagg cagggcttat 420
ttgccacaca gaatggggaa gaccctctcc atgctcaatg taccagagca cttcagaaga 480
ccattcaata taggtcttta caagggaaacg gttgagctca caatgaccat ctacgatgat 540
gagtcactgg aagcagctcc tatgatctgg gatcatttca attcttccaa attttctgat 600
ttcagagaga aggccttaaat gtttggcctg attgtcgaga aaaaggcatc tggagcgtgg 660
gtcctggatt ctgtcagcca cttcaaatga                               690

```

<210> 30

<211> 690

<212> DNA

<213> Vesicular stomatitis virus

<400> 30

```

atgagttcct taaagaagat tctcggctctg aaggggaaag gtaagaaatc taagaaatta 60
gggatcgcac cacccttcta tgaagaggac actaacatgg agtatgctcc gagcgctcca 120
attgacaaat cctatttttg agttgacgag agggacactc atgatccgca tcaattaaga 180
tatgagaaat tcttctttac agtgaaaatg acggtttagat ctaatcgtcc gttcagaaca 240
tactcagatg tggcagccgc tgtatcccat tgggatcaca tgtacatcgg aatggcaggg 300
aaacgtccct tctacaagat cttggctttt ttgggttctt ctaatctaaa ggccactcca 360
gcggtatttg cagatcaagg tcaaccagag tatcacgctc actgtgaagg cagggcttat 420
ttgccacaca gaatggggaa gaccctctcc atgctcaatg taccagagca cttcagaaga 480
ccattcaata taggtcttta caagggaaacg gttgagctca caatgaccat ctacgatgat 540
gagtcactgg aagcagctcc tatgatctgg gatcatttca attcttccaa attttctgat 600
ttcagagaga aggccttaaat gtttggcctg attgtcgaga aaaaggcatc tggagcgtgg 660
gtcctggatt ctgtcagcca cttcaaatga                               690

```

<210> 31

<211> 690

<212> DNA

<213> Vesicular stomatitis virus

<400> 31

```

atgagttcct taaagaagat tctcggctctg aaggggaaag gtaagaaatc taagaaatta 60
gggatcgcac cacccttcta tgaagaggac actaacatgg agtatgctcc gagcgctcca 120
attgacaaat cctatttttg agttgacgag atggacactc atgatccgca tcaattaaga 180
tatgagaaat tcttctttac agtgaaaatg acggtttagat ctaatcgtcc gttcagaaca 240
tactcagatg tggcagccgc tgtatcccat tgggatcaca tgtacatcgg aatggcaggg 300
aaacgtccct tctacaagat cttggctttt ttgggttctt ctaatctaaa ggccactcca 360

```

```

gcggtattgg cagatcaagg tcaaccagag tatcacgctc actgtgaagg cagggcttat 420
ttgccacaca gaatggggaa gacctctccc atgctcaatg taccagagca cttcagaaga 480
ccattcaata taggtcttta caagggaacg gttgagctca caatgaccat ctacgatgat 540
gagtcactgg aagcagctcc tatgatctgg gatcatttca attcttccaa attttctgat 600
ttcagagaga aggccttaat gtttggcctg attgtcgaga aaaaggcatc tggagcttgg 660
gtcctggatt ctgtcagcca cttcaaatga 690

```

<210> 32

<211> 229

<212> PRT

<213> Vesicular stomatitis virus

<400> 32

```

Met Ser Ser Leu Lys Lys Ile Leu Gly Leu Lys Gly Lys Gly Lys Lys
  1             5             10             15

```

```

Ser Lys Lys Leu Gly Ile Ala Pro Pro Pro Tyr Glu Glu Asp Thr Ser
      20             25             30

```

```

Met Glu Tyr Ala Pro Ser Ala Pro Ile Asp Lys Ser Tyr Phe Gly Val
      35             40             45

```

```

Asp Glu Met Asp Thr Tyr Asp Pro Asn Gln Leu Arg Tyr Glu Lys Phe
      50             55             60

```

```

Phe Phe Thr Val Lys Met Thr Val Arg Ser Asn Arg Pro Phe Arg Thr
      65             70             75             80

```

```

Tyr Ser Asp Val Ala Ala Ala Val Ser His Trp Asp His Met Tyr Ile
      85             90             95

```

```

Gly Met Ala Gly Lys Arg Pro Phe Tyr Lys Ile Leu Ala Phe Leu Gly
      100            105            110

```

```

Ser Ser Asn Leu Lys Ala Thr Pro Ala Val Leu Ala Asp Gln Gly Gln
      115            120            125

```

```

Pro Glu Tyr His Thr His Cys Glu Gly Arg Ala Tyr Leu Pro His Arg
      130            135            140

```

```

Met Gly Lys Thr Pro Pro Met Leu Asn Val Pro Glu His Phe Arg Arg
      145            150            155            160

```

```

Pro Phe Asn Ile Gly Leu Tyr Lys Gly Thr Ile Glu Leu Thr Met Thr
      165            170            175

```

```

Ile Tyr Asp Asp Glu Ser Leu Glu Ala Ala Pro Met Ile Trp Asp His
      180            185            190

```

```

Phe Asn Ser Ser Lys Phe Ser Asp Phe Arg Glu Lys Ala Leu Met Phe
      195            200            205

```

```

Gly Leu Ile Val Glu Lys Lys Ala Ser Gly Ala Trp Val Leu Asp Ser
      210            215            220

```

Ile Ser His Phe Lys

225

<210> 33
<211> 229
<212> PRT
<213> Vesicular stomatitis virus

<400> 33

```
Met Ser Ser Leu Lys Lys Ile Leu Gly Leu Lys Gly Lys Gly Lys Lys
 1           5           10           15

Ser Lys Lys Leu Gly Ile Ala Pro Pro Pro Tyr Glu Glu Asp Thr Asn
      20           25           30

Met Glu Tyr Ala Pro Ser Ala Pro Ile Asp Lys Ser Tyr Phe Gly Val
      35           40           45

Asp Glu Met Asp Thr His Asp Pro His Gln Leu Arg Tyr Glu Lys Phe
 50           55           60

Phe Phe Thr Val Lys Met Thr Val Arg Ser Asn Arg Pro Phe Arg Thr
 65           70           75           80

Tyr Ser Asp Val Ala Ala Ala Val Ser His Trp Asp His Met Tyr Ile
      85           90           95

Gly Met Ala Gly Lys Arg Pro Phe Tyr Lys Ile Leu Ala Phe Leu Gly
 100           105           110

Ser Ser Asn Leu Lys Ala Thr Pro Ala Val Leu Ala Asp Gln Gly Gln
 115           120           125

Pro Glu Tyr His Ala His Cys Glu Gly Arg Ala Tyr Leu Pro His Arg
 130           135           140

Met Gly Lys Thr Pro Pro Met Leu Asn Val Pro Glu His Phe Arg Arg
 145           150           155           160

Pro Phe Asn Ile Gly Leu Tyr Lys Gly Thr Val Glu Leu Thr Met Thr
      165           170           175

Ile Tyr Asp Asp Glu Ser Leu Glu Ala Ala Pro Met Ile Trp Asp His
 180           185           190

Phe Asn Ser Ser Lys Phe Ser Asp Phe Arg Glu Lys Ala Leu Met Phe
 195           200           205

Gly Leu Ile Val Glu Lys Lys Ala Ser Gly Ala Trp Val Leu Asp Ser
 210           215           220

Val Ser His Phe Lys
225
```

<210> 34
<211> 229

<212> PRT

<213> Vesicular stomatitis virus

<400> 34

```
Met Ser Ser Leu Lys Lys Ile Leu Gly Leu Lys Gly Lys Gly Lys Lys
  1             5             10             15

Ser Lys Lys Leu Gly Ile Ala Pro Pro Pro Tyr Glu Glu Asp Thr Asn
      20             25             30

Met Glu Tyr Ala Pro Ser Ala Pro Ile Asp Lys Ser Tyr Phe Gly Val
      35             40             45

Asp Glu Met Asp Thr His Asp Pro His Gln Leu Arg Tyr Glu Lys Phe
      50             55             60

Phe Phe Thr Val Lys Met Thr Val Arg Ser Asn Arg Pro Phe Arg Thr
      65             70             75             80

Tyr Ser Asp Val Ala Ala Ala Val Ser His Trp Asp His Met Tyr Ile
      85             90             95

Gly Met Ala Gly Lys Arg Pro Phe Tyr Lys Ile Leu Ala Phe Leu Gly
      100            105            110

Ser Ser Asn Leu Lys Ala Thr Pro Ala Val Leu Ala Asp Gln Gly Gln
      115            120            125

Pro Glu Tyr His Ala His Cys Glu Gly Arg Ala Tyr Leu Pro His Arg
      130            135            140

Met Gly Lys Thr Pro Pro Met Leu Asn Val Pro Glu His Phe Arg Arg
      145            150            155            160

Pro Phe Asn Ile Gly Leu Tyr Lys Gly Thr Val Glu Leu Thr Met Thr
      165            170            175

Ile Tyr Asp Asp Glu Ser Leu Glu Ala Ala Pro Met Ile Trp Asp His
      180            185            190

Phe Asn Ser Ser Lys Phe Ser Asp Phe Arg Glu Lys Ala Leu Met Phe
      195            200            205

Gly Leu Ile Val Glu Lys Lys Ala Ser Gly Ala Trp Val Leu Asp Ser
      210            215            220

Val Ser His Phe Lys
      225
```

<210> 35

<211> 229

<212> PRT

<213> Vesicular stomatitis virus

<400> 35

```
Met Ser Ser Leu Lys Lys Ile Leu Gly Leu Lys Gly Lys Gly Lys Lys
```

1	5	10	15
Ser Lys Lys Leu Gly Ile Ala Pro Pro Pro Tyr Glu Glu Asp Thr Asn	20	25	30
Met Glu Tyr Ala Pro Ser Ala Pro Ile Asp Lys Ser Tyr Phe Gly Val	35	40	45
Asp Glu Arg Asp Thr His Asp Pro His Gln Leu Arg Tyr Glu Lys Phe	50	55	60
Phe Phe Thr Val Lys Met Thr Val Arg Ser Asn Arg Pro Phe Arg Thr	65	70	75
Tyr Ser Asp Val Ala Ala Ala Val Ser His Trp Asp His Met Tyr Ile	85	90	95
Gly Met Ala Gly Lys Arg Pro Phe Tyr Lys Ile Leu Ala Phe Leu Gly	100	105	110
Ser Ser Asn Leu Lys Ala Thr Pro Ala Val Leu Ala Asp Gln Gly Gln	115	120	125
Pro Glu Tyr His Ala His Cys Glu Gly Arg Ala Tyr Leu Pro His Arg	130	135	140
Met Gly Lys Thr Pro Pro Met Leu Asn Val Pro Glu His Phe Arg Arg	145	150	155
Pro Phe Asn Ile Gly Leu Tyr Lys Gly Thr Val Glu Leu Thr Met Thr	165	170	175
Ile Tyr Asp Asp Glu Ser Leu Glu Ala Ala Pro Met Ile Trp Asp His	180	185	190
Phe Asn Ser Ser Lys Phe Ser Asp Phe Arg Glu Lys Ala Leu Met Phe	195	200	205
Gly Leu Ile Val Glu Lys Lys Ala Ser Gly Ala Trp Val Leu Asp Ser	210	215	220
Val Ser His Phe Lys	225		

<210> 36
 <211> 1536
 <212> DNA
 <213> Vesicular stomatitis virus

<400> 36
 atgaagtgcc ttttgtactt agccttttta ttcattgggg tgaattgcaa gttcaccata 60
 gtttttccac acaaccaaaa aggaaactgg aaaaatgttc cttctaatta ccattattgc 120
 ccgtaagct cagattttaa ttggcataat gacttaatag gcacagccat acaagtcaaa 180
 atgccaaga gtcacaaggc tattcaagca gacggttga tgtgtcatgc ttccaaatgg 240
 gtcactactt gtgatttccg ctggtatgga ccgaagtata taacacagtc catccgatcc 300
 ttcactccat ctgtagaaca atgcaaggaa agcattgaac aaacgaaaca aggaacttgg 360

```

ctgaatccag gcttccctcc tcaaagttgt ggatatgcaa ctgtgacgga tgccgaagca 420
gtgattgtcc aggtgactcc tcacatgtg ctggttgatg aatacacagg agaatgggtt 480
gattcacagt tcatcaacgg aaaatgcagc aattacatat gcccactgt ccataactct 540
acaacctggc attctgacta taagggtcaaa gggctatgtg attctaacct catttccatg 600
gacatcacct tcttctcaga ggacggagag ctatcatccc tgggaaagga gggcacaggg 660
ttcagaagta actactttgc ttatgaaact ggaggcaagg cctgcaaaat gcaatactgc 720
aagcattggg gagtcagact cccatcaggt gtctggttcg agatggctga taaggatctc 780
tttgctgcag ccagattccc tgaatgccc gaagggtcaa gtatctctgc tccatctcag 840
acctcagtgg atgtaagtct aattcaggac gttgagagga tcttggatta tccctctgc 900
caagaaacct ggagcaaaat cagagcgggt cttccaatct ctccagtga tctcagctat 960
cttgctccta aaaacccagg aaccggtcct gctttcacca taatcaatgg taccctaaaa 1020
tactttgaga ccagatacat cagagtcgat attgctgctc caatcctctc aagaatgggtc 1080
ggaatgatca gtggaactac cacagaaagg gaactgtggg atgactgggc accatatgaa 1140
gacgtggaaa ttggacccaa tggagtctg aggaccagtt caggatataa gtttccctta 1200
tacatgattg gacatggtat gttggactcc gatcttcac ttagctcaaa ggctcaggtg 1260
ttcgaacatc ctcacattca agacgctgct tcgcaacttc ctgatgatga gagtttattt 1320
tttggtgata ctgggctatc caaaaatcca atcgagcttg tagaagggtg gttcagtagt 1380
tggaagagct ctattgcctc ttttttcttt atcatagggg taatcattgg actattcttg 1440
gttctccgag ttggtatcca tctttgcatt aaattaaagc acaccaagaa aagacagatt 1500
tatacagaca tagagatgaa ccgacttggg aagtaa 1536

```

<210> 37

<211> 885

<212> DNA

<213> Vesicular stomatitis virus

<220>

<221> modified_base

<222> (1)..(885)

<223> "n" represents a, t, c, g, other or unknown

<400> 37

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atgaagtgcc ttttgkactt agctttttta ttcacggtgg tgaattgcaa gttcaccata 60
gtttttccat acaacccaaa aggaaactgg aaaaatgttc cttccaatta ccattattgc 120
ccgtcaagct cagattttaa ttgncataat gacttaatag gcacagcctt acaagtcaaa 180
atgcccaaga gtcacaaggc tattcaagca gacggttggg tgtgtcatgc ttccaaatgg 240
gtcactactt gtgatttccg ctggtacgga ccgaagtata taacacattc catccgatcc 300
ttcactccat ctgtagaaca atgcaaggaa agcattgaac aaacgaaaca aggaacttgg 360
ctgaatccag gcttccctcc tcaaagttgt ggatatgcaa ctgtgacgga tgctgaagca 420
gcgattgtcc aggtgactcc tcacatgtg cttgttgatg aatacacagg agaatgggtt 480
gattcacagt tcatcaacgg aaaatgcagc aatgacatat gcccactgt ccataactcc 540
acaacctggc attccgacta taagggtcaaa gggctatgtg attctaacct catttccatg 600
gacatcacct tcttctcaga ggacggagag ctatcatccc taggaaagga gggcacaggg 660
ttcagaagta actactttgc ttatgaaact ggagacaagg cctgcaaaat gcagtactgc 720
aagcgttggg gagtcagact cccatcaggt gtctggttcg agatggctga taaggatctc 780
tttgctgcag ccagattccc tgaatgccc gaagggtcaa gtatctctgc tccatctcag 840
acctcagtgg atgtaagtct cattcaggac gttgagagga tcttg 885

```

<210> 38

<211> 705

<212> DNA

<213> Vesicular stomatitis virus

<400> 38

```

ccatctcaga cctcagtgga tgtaagtctc attcaggacg ttgagaggat cttggattat 60

```


tccctctgcc	aagaaacctg	gagcaaaatc	agagcgggtc	ttcccatctc	tccagtggat	120
ctcagctatc	ttgctcctaa	aaacccagga	accggtcctg	tctttaccat	aatcaatggg	180
accctaaaat	actttgagac	cagatacatc	agagtcgata	ttgctgctcc	aatcctctca	240
agaatggtcg	gaatgatcag	tggaaactacc	acagaaaagg	aactgtggga	tgactgggct	300
ccatatgaag	acgtggaaat	tggaccaaat	ggagtctctga	ggaccagttc	aggatataag	360
tttcctttat	atatgattgg	acatgggatg	ttggactccg	atcttcacat	tagctcaaag	420
gctcaggtgt	ttgaacatcc	tcacattcaa	gacgctgctt	cgcagcttcc	tgatgatgag	480
actttatttt	ttggtgatac	tgggctatcc	aaaaatccaa	tcgagtttgt	agaaggttgg	540
ttcagtagtt	ggaagagctc	tattgcctct	tttttcttta	tcatagggtt	aatcattgga	600
ctattcttgg	ttctccgagt	tggatattat	ctttgcatta	aattaaagca	caccaagaaa	660
agacagattt	atacagacat	agagatgaac	cgacttggga	agtaa		705

<210> 39

<211> 1536

<212> DNA

<213> Vesicular stomatitis virus

<400> 39

atgaagtgcc	ttttgtactt	agctttttta	ttcatcgggg	tgaattgcaa	gttcaccata	60
gtttttccat	acaaccgaaa	aggaaaactgg	aaaaatgttc	cttccaatta	ccattattgc	120
ccgtcaagct	cagatttaaa	ttggcataat	gacttaatag	gcacagcctt	acaagtcaaa	180
atgcccaga	gtcacaaggc	tattcaagca	gacggttggg	tgtgtcatgc	ttccaaatgg	240
gtcactactt	gtgatttccg	ctggtacgga	ccgaagtata	taacacattc	catccgatcc	300
ttcactccat	ctgtagaaca	atgcaaggaa	agcattgaac	aaacgaaaca	aggaaacttg	360
ctgaatccag	gcttccctcc	tcaaagtgtg	ggatatgcaa	ctgtgacgga	tgctgaagca	420
gcgattgtcc	aggtgactcc	tcaccatgtg	cttgttgatg	aatacacagg	agaatggggt	480
gattcacagt	tcataacagg	aaaatgcagc	aatgacatat	gccccactgt	ccataactcc	540
acaacctggc	attccgacta	taagggtcaaa	gggctatgtg	attctaacct	catttccatg	600
gacatcacct	tcttctcaga	ggacggagag	ctatcatccc	taggaaagga	gggcacaggg	660
ttcagaagta	actactttgc	ttatgaaact	ggagacaagg	cctgcaaaat	gcagtactgc	720
aagcattggg	gagtcagact	cccatcaggt	gtctgggttcg	agatggctga	taaggatctc	780
tttgcgtcag	ccagattccc	tgaatgccca	gaagggtcaa	gtatctctgc	tccatctcag	840
acctcagtgg	atgtaagtct	cattcaggac	gttgagagga	tcttggatta	ttccctctgc	900
caagaaacct	ggagcaaaat	cagagcgggt	cttcccacat	ctccagtggg	tctcagctat	960
cttgctccta	aaaacccagg	aaccggtcct	gctttcacca	taatcaatgg	taccctaaaa	1020
tactttgaga	ccagatacat	cagagtcgat	attgctgctc	caatcctctc	aagaatgggtc	1080
ggaatgatca	gtggaactac	cacagaaaagg	gaactgtggg	atgactgggc	tccatatgaa	1140
gacgtggaaa	ttggacccaa	tggagtctctg	aggaccagtt	caggatataa	gtttccttta	1200
tatatgattg	gacatggtat	gttggactcc	gatcttcac	ttagctcaaa	ggctcagggtg	1260
tttgaacatc	ctcacattca	agacgctght	gcgcagcttc	ctgatgatga	gactttatct	1320
tttgggtgata	ctgggctatc	caaaaatcca	atcgagtttg	tagaagggtg	gttcagtagt	1380
tggaaagagct	ctattgcctc	ttttttcttt	atcatagggt	taatcattgg	actattcttg	1440
gttctccgag	ttggtattta	tctttgcatt	aaattaaagc	acaccaagaa	aagacagatt	1500
tatacagaca	tagagatgaa	ccgacttggg	aagtaa			1536

<210> 40

<211> 1399

<212> DNA

<213> Vesicular stomatitis virus

<400> 40

atgaagtgcc	ttttgtactt	agctttttta	ttcatcgggg	tgaattgcaa	gttcaccata	60
gtttttccat	acaaccaaaa	aggaaaactgg	aaaaatgttc	cttccaatta	ccattattgc	120
ccgtcaagct	cagatttaaa	ttggcataat	gacttaatag	gcacagcctt	acagggtcaaa	180
atgcccaga	gtcacaaggc	tattcaagca	gacggttggg	tgtgtcatgc	ttccaaatgg	240

```

gtcactactt gtgatttccg ctggtacgga ccgaagtata taacacattc catccgatcc 300
ttcactccat ctgtagaaca atgcaaggaa agcattgaac aaacgaaaca aggaacttgg 360
ctgaatccag gcttccctcc tcaaagtgtg ggatatgcaa ctgtgacgga tgctgaagca 420
gcgattgtcc aggtgactcc tcaccatgtg cttgttgatg aatacacagg agaatgggtt 480
gattcacagt tcatcaacgg aaaatgcagc aatgacatat gcccactgt ccataactcc 540
acaacctggc attccgacta taaggtcaaa gggctatgtg attctaacct catttccatg 600
gacatcacct tcttctcaga ggacggagag ctatcatccc taggaaagga gggcacaggg 660
ttcagaagta actactttgc ttatgaaact ggagacaagg cctgcaaaat gcagtactgc 720
aagcgttggg gagtcagact cccatcaggt gtctggttcg ggatggctga taaggatctc 780
tttgctgcag ccagattccc tgaatgccca gaagggtcaa gtatctctgc tccatctcag 840
acctcagtgg atgtaagtct cattcaggac gttgagagga tcttactttg agaccagata 900
catcagatgc gatattgctg ctccaatcct ctcaagaatg gtcggaatga tcagtggaac 960
taccacagaa agggaaactgt gggatgactg ggctccatat gaagacgtgg aaattggacc 1020
caatggagtt ctgaggacca gttcaggata taagtttcct ttatatatga ttggacatgg 1080
tatgttggac tccgatcttc atcttagctc aaaggctcag gtgtttgaac atcctcacat 1140
tcaagacgct gcttcgcagc ttcctgatga tgagacttta ttttttggtg atactgggct 1200
atccaaaaat ccaatcgagt ttgtagaagg ttggttcagt agttggaaga gctctattgc 1260
ctcttttttc tttatcatag ggtaaatcat tggactattc ttggttctcc gagttggtat 1320
ttatctttgc attaaattaa agcacaccaa gaaaagacag atttatacag acatagagat 1380
gaaccgactt gggaagtaa                                     1399

```

<210> 41

<211> 511

<212> PRT

<213> Vesicular stomatitis virus

<400> 41

```

Met Lys Cys Leu Leu Tyr Leu Ala Phe Leu Phe Ile Gly Val Asn Cys
  1                      5                      10                      15

```

```

Lys Phe Thr Ile Val Phe Pro His Asn Gln Lys Gly Asn Trp Lys Asn
      20                      25                      30

```

```

Val Pro Ser Asn Tyr His Tyr Cys Pro Ser Ser Ser Asp Leu Asn Trp
      35                      40                      45

```

```

His Asn Asp Leu Ile Gly Thr Ala Ile Gln Val Lys Met Pro Lys Ser
      50                      55                      60

```

```

His Lys Ala Ile Gln Ala Asp Gly Trp Met Cys His Ala Ser Lys Trp
      65                      70                      75                      80

```

```

Val Thr Thr Cys Asp Phe Arg Trp Tyr Gly Pro Lys Tyr Ile Thr Gln
      85                      90                      95

```

```

Ser Ile Arg Ser Phe Thr Pro Ser Val Glu Gln Cys Lys Glu Ser Ile
     100                      105                      110

```

```

Glu Gln Thr Lys Gln Gly Thr Trp Leu Asn Pro Gly Phe Pro Pro Gln
     115                      120                      125

```

```

Ser Cys Gly Tyr Ala Thr Val Thr Asp Ala Glu Ala Val Ile Val Gln
     130                      135                      140

```

```

Val Thr Pro His His Val Leu Val Asp Glu Tyr Thr Gly Glu Trp Val
     145                      150                      155                      160

```

Asp	Ser	Gln	Phe	Ile	Asn	Gly	Lys	Cys	Ser	Asn	Tyr	Ile	Cys	Pro	Thr	
				165					170					175		
Val	His	Asn	Ser	Thr	Thr	Trp	His	Ser	Asp	Tyr	Lys	Val	Lys	Gly	Leu	
			180					185					190			
Cys	Asp	Ser	Asn	Leu	Ile	Ser	Met	Asp	Ile	Thr	Phe	Phe	Ser	Glu	Asp	
		195					200					205				
Gly	Glu	Leu	Ser	Ser	Leu	Gly	Lys	Glu	Gly	Thr	Gly	Phe	Arg	Ser	Asn	
	210					215					220					
Tyr	Phe	Ala	Tyr	Glu	Thr	Gly	Gly	Lys	Ala	Cys	Lys	Met	Gln	Tyr	Cys	
225					230					235					240	
Lys	His	Trp	Gly	Val	Arg	Leu	Pro	Ser	Gly	Val	Trp	Phe	Glu	Met	Ala	
				245					250					255		
Asp	Lys	Asp	Leu	Phe	Ala	Ala	Ala	Arg	Phe	Pro	Glu	Cys	Pro	Glu	Gly	
			260					265					270			
Ser	Ser	Ile	Ser	Ala	Pro	Ser	Gln	Thr	Ser	Val	Asp	Val	Ser	Leu	Ile	
		275					280					285				
Gln	Asp	Val	Glu	Arg	Ile	Leu	Asp	Tyr	Ser	Leu	Cys	Gln	Glu	Thr	Trp	
	290					295					300					
Ser	Lys	Ile	Arg	Ala	Gly	Leu	Pro	Ile	Ser	Pro	Val	Asp	Leu	Ser	Tyr	
305					310					315					320	
Leu	Ala	Pro	Lys	Asn	Pro	Gly	Thr	Gly	Pro	Ala	Phe	Thr	Ile	Ile	Asn	
				325					330					335		
Gly	Thr	Leu	Lys	Tyr	Phe	Glu	Thr	Arg	Tyr	Ile	Arg	Val	Asp	Ile	Ala	
			340					345					350			
Ala	Pro	Ile	Leu	Ser	Arg	Met	Val	Gly	Met	Ile	Ser	Gly	Thr	Thr	Thr	
		355					360					365				
Glu	Arg	Glu	Leu	Trp	Asp	Asp	Trp	Ala	Pro	Tyr	Glu	Asp	Val	Glu	Ile	
	370					375					380					
Gly	Pro	Asn	Gly	Val	Leu	Arg	Thr	Ser	Ser	Gly	Tyr	Lys	Phe	Pro	Leu	
385					390					395					400	
Tyr	Met	Ile	Gly	His	Gly	Met	Leu	Asp	Ser	Asp	Leu	His	Leu	Ser	Ser	
				405					410					415		
Lys	Ala	Gln	Val	Phe	Glu	His	Pro	His	Ile	Gln	Asp	Ala	Ala	Ser	Gln	
			420					425					430			
Leu	Pro	Asp	Asp	Glu	Ser	Leu	Phe	Phe	Gly	Asp	Thr	Gly	Leu	Ser	Lys	
		435					440					445				
Asn	Pro	Ile	Glu	Leu	Val	Glu	Gly	Trp	Phe	Ser	Ser	Trp	Lys	Ser	Ser	
	450					455					460					

Ile Ala Ser Phe Phe Phe Ile Ile Gly Leu Ile Ile Gly Leu Phe Leu
 465 470 475 480

Val Leu Arg Val Gly Ile His Leu Cys Ile Lys Leu Lys His Thr Lys
 485 490 495

Lys Arg Gln Ile Tyr Thr Asp Ile Glu Met Asn Arg Leu Gly Lys
 500 505 510

<210> 42

<211> 295

<212> PRT

<213> Vesicular stomatitis virus

<220>

<221> MOD_RES

<222> (1)..(295)

<223> "Xaa" represents any, other or unknown amino acid

<400> 42

Met Lys Cys Leu Leu Xaa Leu Ala Phe Leu Phe Ile Gly Val Asn Cys
 1 5 10 15

Lys Phe Thr Ile Val Phe Pro Tyr Asn Gln Lys Gly Asn Trp Lys Asn
 20 25 30

Val Pro Ser Asn Tyr His Tyr Cys Pro Ser Ser Ser Asp Leu Asn Xaa
 35 40 45

His Asn Asp Leu Ile Gly Thr Ala Leu Gln Val Lys Met Pro Lys Ser
 50 55 60

His Lys Ala Ile Gln Ala Asp Gly Trp Met Cys His Ala Ser Lys Trp
 65 70 75 80

Val Thr Thr Cys Asp Phe Arg Trp Tyr Gly Pro Lys Tyr Ile Thr His
 85 90 95

Ser Ile Arg Ser Phe Thr Pro Ser Val Glu Gln Cys Lys Glu Ser Ile
 100 105 110

Glu Gln Thr Lys Gln Gly Thr Trp Leu Asn Pro Gly Phe Pro Pro Gln
 115 120 125

Ser Cys Gly Tyr Ala Thr Val Thr Asp Ala Glu Ala Ala Ile Val Gln
 130 135 140

Val Thr Pro His His Val Leu Val Asp Glu Tyr Thr Gly Glu Trp Val
 145 150 155 160

Asp Ser Gln Phe Ile Asn Gly Lys Cys Ser Asn Asp Ile Cys Pro Thr
 165 170 175

Val His Asn Ser Thr Thr Trp His Ser Asp Tyr Lys Val Lys Gly Leu
 180 185 190

Cys Asp Ser Asn Leu Ile Ser Met Asp Ile Thr Phe Phe Ser Glu Asp
 195 200 205
 Gly Glu Leu Ser Ser Leu Gly Lys Glu Gly Thr Gly Phe Arg Ser Asn
 210 215 220
 Tyr Phe Ala Tyr Glu Thr Gly Asp Lys Ala Cys Lys Met Gln Tyr Cys
 225 230 235 240
 Lys Arg Trp Gly Val Arg Leu Pro Ser Gly Val Trp Phe Glu Met Ala
 245 250 255
 Asp Lys Asp Leu Phe Ala Ala Ala Arg Phe Pro Glu Cys Pro Glu Gly
 260 265 270
 Ser Ser Ile Ser Ala Pro Ser Gln Thr Ser Val Asp Val Ser Leu Ile
 275 280 285
 Gln Asp Val Glu Arg Ile Leu
 290 295

<210> 43
 <211> 234
 <212> PRT
 <213> Vesicular stomatitis virus

<400> 43
 Pro Ser Gln Thr Ser Val Asp Val Ser Leu Ile Gln Asp Val Glu Arg
 1 5 10 15
 Ile Leu Asp Tyr Ser Leu Cys Gln Glu Thr Trp Ser Lys Ile Arg Ala
 20 25 30
 Gly Leu Pro Ile Ser Pro Val Asp Leu Ser Tyr Leu Ala Pro Lys Asn
 35 40 45
 Pro Gly Thr Gly Pro Val Phe Thr Ile Ile Asn Gly Thr Leu Lys Tyr
 50 55 60
 Phe Glu Thr Arg Tyr Ile Arg Val Asp Ile Ala Ala Pro Ile Leu Ser
 65 70 75 80
 Arg Met Val Gly Met Ile Ser Gly Thr Thr Thr Glu Arg Glu Leu Trp
 85 90 95
 Asp Asp Trp Ala Pro Tyr Glu Asp Val Glu Ile Gly Pro Asn Gly Val
 100 105 110
 Leu Arg Thr Ser Ser Gly Tyr Lys Phe Pro Leu Tyr Met Ile Gly His
 115 120 125
 Gly Met Leu Asp Ser Asp Leu His Leu Ser Ser Lys Ala Gln Val Phe
 130 135 140
 Glu His Pro His Ile Gln Asp Ala Ala Ser Gln Leu Pro Asp Asp Glu

145		150		155		160									
Thr	Leu	Phe	Phe	Gly	Asp	Thr	Gly	Leu	Ser	Lys	Asn	Pro	Ile	Glu	Phe
				165					170					175	
Val	Glu	Gly	Trp	Phe	Ser	Ser	Trp	Lys	Ser	Ser	Ile	Ala	Ser	Phe	Phe
			180					185					190		
Phe	Ile	Ile	Gly	Leu	Ile	Ile	Gly	Leu	Phe	Leu	Val	Leu	Arg	Val	Gly
		195					200					205			
Ile	Tyr	Leu	Cys	Ile	Lys	Leu	Lys	His	Thr	Lys	Lys	Arg	Gln	Ile	Tyr
	210					215					220				
Thr	Asp	Ile	Glu	Met	Asn	Arg	Leu	Gly	Lys						
225					230										

<210> 44
 <211> 511
 <212> PRT
 <213> Vesicular stomatitis virus

<220>
 <221> MOD_RES
 <222> (1)..(511)
 <223> "Xaa" represents any, other or unknown amino acid

<400> 44
Met Lys Cys Leu Leu Tyr Leu Ala Phe Leu Phe Ile Gly Val Asn Cys
1 5 10 15
Lys Phe Thr Ile Val Phe Pro Tyr Asn Arg Lys Gly Asn Trp Lys Asn
20 25 30
Val Pro Ser Asn Tyr His Tyr Cys Pro Ser Ser Ser Asp Leu Asn Trp
35 40 45
His Asn Asp Leu Ile Gly Thr Ala Leu Gln Val Lys Met Pro Lys Ser
50 55 60
His Lys Ala Ile Gln Ala Asp Gly Trp Met Cys His Ala Ser Lys Trp
65 70 75 80
Val Thr Thr Cys Asp Phe Arg Trp Tyr Gly Pro Lys Tyr Ile Thr His
85 90 95
Ser Ile Arg Ser Phe Thr Pro Ser Val Glu Gln Cys Lys Glu Ser Ile
100 105 110
Glu Gln Thr Lys Gln Gly Thr Trp Leu Asn Pro Gly Phe Pro Pro Gln
115 120 125
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Val Thr Pro His His Val Leu Val Asp Glu Tyr Thr Gly Glu Trp Val

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Lys	His	Trp	Gly	Val	Arg	Leu	Pro	Ser	Gly	Val	Trp	Phe	Glu	Met	Ala
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Asp	Lys	Asp	Leu	Phe	Ala	Ala	Ala	Arg	Phe	Pro	Glu	Cys	Pro	Glu	Gly
			260					265					270		
Ser	Ser	Ile	Ser	Ala	Pro	Ser	Gln	Thr	Ser	Val	Asp	Val	Ser	Leu	Ile
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450

455

460

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Lys Arg Gln Ile Tyr Thr Asp Ile Glu Met Asn Arg Leu Gly Lys
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<210> 45

<211> 465

<212> PRT

<213> Vesicular stomatitis virus

<400> 45

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Val Pro Ser Asn Tyr His Tyr Cys Pro Ser Ser Ser Asp Leu Asn Trp
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His Asn Asp Leu Ile Gly Thr Ala Leu Gln Val Lys Met Pro Lys Ser
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His Lys Ala Ile Gln Ala Asp Gly Trp Met Cys His Ala Ser Lys Trp
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Val Thr Thr Cys Asp Phe Arg Trp Tyr Gly Pro Lys Tyr Ile Thr His
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Glu Gln Thr Lys Gln Gly Thr Trp Leu Asn Pro Gly Phe Pro Pro Gln
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Ser Cys Gly Tyr Ala Thr Val Thr Asp Ala Glu Ala Ala Ile Val Gln
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Val Thr Pro His His Val Leu Val Asp Glu Tyr Thr Gly Glu Trp Val
145 150 155 160

Asp Ser Gln Phe Ile Asn Gly Lys Cys Ser Asn Asp Ile Cys Pro Thr
165 170 175

Val His Asn Ser Thr Thr Trp His Ser Asp Tyr Lys Val Lys Gly Leu
180 185 190

Cys Asp Ser Asn Leu Ile Ser Met Asp Ile Thr Phe Phe Ser Glu Asp
195 200 205

Gly Glu Leu Ser Ser Leu Gly Lys Glu Gly Thr Gly Phe Arg Ser Asn
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 405 410 415
 Ser Ser Ile Ala Ser Phe Phe Phe Ile Ile Gly Leu Ile Ile Gly Leu
 420 425 430
 Phe Leu Val Leu Arg Val Gly Ile Tyr Leu Cys Ile Lys Leu Lys His
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 Thr Lys Lys Arg Gln Ile Tyr Thr Asp Ile Glu Met Asn Arg Leu Gly
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Lys
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<210> 46
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 <212> DNA
 <213> Vesicular stomatitis virus

<400> 46

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<211> 5327

<212> DNA

<213> Vesicular stomatitis virus

<400> 47

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<210> 48

<211> 348

<212> DNA

<213> Vesicular stomatitis virus

<400> 48

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<210> 49

<211> 6330

<212> DNA

<213> Vesicular stomatitis virus

<220>

<221> modified_base

<222> (1)..(6330)

<223> "n" represents a, t, c, g, other or unknown

<400> 49

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<210> 50

<211> 2109

<212> PRT

<213> Vesicular stomatitis virus

<400> 50

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Tyr	Leu	Asn	His	Ala	Asp	Tyr	Asn	Leu	Asn	Ser	Pro	Leu	Ile	Ser	Asp	
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Ser	Ser	His	Gly	Thr	Asn	Ile	Cys	Arg	Ile	Arg	Val	Pro	Ser	Leu	Gly	
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Lys	Ile	Val	Glu	Arg	Gln	Gly	Asn	Phe	Ser	Tyr	Asp	Leu	Ile	Lys	Met	
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Val	Glu	Pro	Ile	Cys	Asn	Leu	Lys	Leu	Met	Lys	Leu	Ala	Arg	Glu	Ser	
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Thr	Met	Leu	Asp	Thr	Lys	Ala	Thr	Asn	Trp	Lys	Glu	Phe	Leu	Lys	Glu	
			500					505					510			
Ile	Asp	Glu	Lys	Gly	Leu	Asp	Asp	Asp	Asp	Leu	Ile	Ile	Gly	Leu	Lys	
	515						520					525				
Gly	Lys	Glu	Arg	Glu	Leu	Lys	Leu	Ala	Gly	Arg	Phe	Phe	Ser	Leu	Met	
	530					535					540					
Ser	Trp	Lys	Leu	Arg	Glu	Tyr	Phe	Val	Ile	Thr	Glu	Tyr	Leu	Ile	Lys	
545					550					555					560	
Thr	His	Phe	Val	Pro	Met	Phe	Lys	Gly	Leu	Thr	Met	Ala	Asp	Asp	Leu	
				565					570					575		
Thr	Ala	Val	Ile	Lys	Lys	Met	Leu	Asp	Ser	Ser	Ser	Gly	Gln	Gly	Leu	
			580					585					590			

Lys	Ser	Tyr	Glu	Ala	Ile	Cys	Ile	Ala	Asn	His	Ile	Asp	Tyr	Glu	Lys	595	600	605
Trp	Asn	Asn	His	Gln	Arg	Lys	Leu	Ser	Asn	Gly	Pro	Val	Phe	Arg	Val	610	615	620
Met	Gly	Gln	Phe	Leu	Gly	Tyr	Pro	Ser	Leu	Ile	Glu	Arg	Thr	His	Glu	625	630	635
Phe	Phe	Glu	Lys	Ser	Leu	Ile	Tyr	Tyr	Asn	Gly	Arg	Pro	Asp	Leu	Met	645	650	655
Arg	Val	His	Asn	Asn	Thr	Leu	Ile	Asn	Ser	Thr	Ser	Gln	Arg	Val	Cys	660	665	670
Trp	Gln	Gly	Gln	Glu	Gly	Gly	Leu	Glu	Gly	Leu	Arg	Gln	Lys	Gly	Trp	675	680	685
Thr	Ile	Leu	Asn	Leu	Leu	Val	Ile	Gln	Arg	Glu	Ala	Lys	Ile	Arg	Asn	690	695	700
Thr	Ala	Val	Lys	Val	Leu	Ala	Gln	Gly	Asp	Asn	Gln	Val	Ile	Cys	Thr	705	710	715
Gln	Tyr	Lys	Thr	Lys	Lys	Ser	Arg	Asn	Val	Val	Glu	Leu	Gln	Gly	Ala	725	730	735
Leu	Asn	Gln	Met	Val	Ser	Asn	Asn	Glu	Lys	Ile	Met	Thr	Ala	Ile	Lys	740	745	750
Ile	Gly	Thr	Gly	Lys	Leu	Gly	Leu	Leu	Ile	Asn	Asp	Asp	Glu	Thr	Met	755	760	765
Gln	Ser	Ala	Asp	Tyr	Leu	Asn	Tyr	Gly	Lys	Ile	Pro	Ile	Phe	Arg	Gly	770	775	780
Val	Ile	Arg	Gly	Leu	Glu	Thr	Lys	Arg	Trp	Ser	Arg	Val	Thr	Cys	Val	785	790	795
Thr	Asn	Asp	Gln	Ile	Pro	Thr	Cys	Ala	Asn	Ile	Met	Ser	Ser	Val	Ser	805	810	815
Thr	Asn	Ala	Leu	Thr	Val	Ala	His	Phe	Ala	Glu	Asn	Pro	Ile	Asn	Ala	820	825	830
Met	Ile	Gln	Tyr	Asn	Tyr	Phe	Gly	Thr	Phe	Ala	Arg	Leu	Leu	Leu	Met	835	840	845
Met	His	Asp	Pro	Ala	Leu	Arg	Gln	Ser	Leu	Tyr	Glu	Val	Gln	Asp	Lys	850	855	860
Ile	Pro	Gly	Leu	His	Ser	Ser	Thr	Phe	Lys	Tyr	Ala	Met	Leu	Tyr	Leu	865	870	875
Asp	Pro	Ser	Ile	Gly	Gly	Val	Ser	Gly	Met	Ser	Leu	Ser	Arg	Phe	Leu	885	890	895

Ile Arg Ala Phe Pro Asp Pro Val Thr Glu Ser Leu Ser Phe Trp Arg
 900 905 910
 Phe Ile His Val His Ala Arg Ser Glu His Leu Lys Glu Met Ser Ala
 915 920 925
 Val Phe Gly Asn Pro Glu Ile Ala Lys Phe Arg Ile Thr His Ile Asp
 930 935 940
 Lys Leu Val Glu Asp Pro Thr Ser Leu Asn Ile Ala Met Gly Met Ser
 945 950 955 960
 Pro Ala Asn Leu Leu Lys Thr Glu Val Lys Lys Cys Leu Ile Glu Ser
 965 970 975
 Arg Gln Thr Ile Arg Asn Gln Val Ile Lys Asp Ala Thr Ile Tyr Leu
 980 985 990
 Tyr His Glu Glu Asp Arg Leu Arg Ser Phe Leu Trp Ser Ile Asn Pro
 995 1000 1005
 Leu Phe Pro Arg Phe Leu Ser Glu Phe Lys Ser Gly Thr Phe Leu Gly
 1010 1015 1020
 Val Ala Asp Gly Leu Ile Ser Leu Phe Gln Asn Ser Arg Thr Ile Arg
 1025 1030 1035 1040
 Asn Ser Phe Lys Lys Lys Tyr His Arg Glu Leu Asp Asp Leu Ile Val
 1045 1050 1055
 Arg Ser Glu Val Ser Ser Leu Thr His Leu Gly Lys Leu His Leu Arg
 1060 1065 1070
 Arg Gly Ser Cys Lys Met Trp Thr Cys Ser Ala Thr His Ala Asp Thr
 1075 1080 1085
 Leu Arg Tyr Lys Ser Trp Gly Arg Thr Val Ile Gly Thr Thr Val Pro
 1090 1095 1100
 His Pro Leu Glu Met Leu Gly Pro Gln His Arg Lys Glu Thr Pro Cys
 1105 1110 1115 1120
 Ala Pro Cys Asn Thr Ser Gly Phe Asn Tyr Val Ser Val His Cys Pro
 1125 1130 1135
 Asp Gly Ile His Asp Val Phe Ser Ser Arg Gly Pro Leu Pro Ala Tyr
 1140 1145 1150
 Leu Gly Ser Lys Thr Ser Glu Ser Thr Ser Ile Leu Gln Pro Trp Glu
 1155 1160 1165
 Arg Glu Ser Lys Val Pro Leu Ile Lys Arg Ala Thr Arg Leu Arg Asp
 1170 1175 1180
 Ala Ile Ser Trp Phe Val Glu Pro Asp Ser Lys Leu Ala Met Thr Ile
 1185 1190 1195 1200

Leu Ser Asn Ile His Ser Leu Thr Gly Glu Glu Trp Thr Lys Arg Gln
 1205 1210 1215
 His Gly Phe Lys Arg Thr Gly Ser Ala Leu His Arg Phe Ser Thr Ser
 1220 1225 1230
 Arg Met Ser His Gly Gly Phe Ala Ser Gln Ser Thr Ala Ala Leu Thr
 1235 1240 1245
 Arg Leu Met Ala Thr Thr Asp Thr Met Arg Asp Leu Gly Asp Gln Asn
 1250 1255 1260
 Phe Asp Phe Leu Phe Gln Ala Thr Leu Leu Tyr Ala Gln Ile Thr Thr
 1265 1270 1275 1280
 Thr Val Ala Arg Asp Gly Trp Ile Thr Ser Cys Thr Asp His Tyr His
 1285 1290 1295
 Ile Ala Cys Lys Ser Cys Leu Arg Pro Ile Glu Glu Ile Thr Leu Asp
 1300 1305 1310
 Ser Ser Met Asp Tyr Thr Pro Pro Asp Val Ser His Val Leu Lys Thr
 1315 1320 1325
 Trp Arg Asn Gly Glu Gly Ser Trp Gly Gln Glu Ile Lys Gln Ile Tyr
 1330 1335 1340
 Pro Leu Glu Gly Asn Trp Lys Asn Leu Ala Pro Ala Glu Gln Ser Tyr
 1345 1350 1355 1360
 Gln Val Gly Arg Cys Ile Gly Phe Leu Tyr Gly Asp Leu Ala Tyr Arg
 1365 1370 1375
 Lys Ser Thr His Ala Glu Asp Ser Ser Leu Phe Pro Leu Ser Ile Gln
 1380 1385 1390
 Gly Arg Ile Arg Gly Arg Gly Phe Leu Lys Gly Leu Leu Asp Gly Leu
 1395 1400 1405
 Met Arg Ala Ser Cys Cys Gln Val Ile His Arg Arg Ser Leu Ala His
 1410 1415 1420
 Leu Lys Arg Pro Ala Asn Ala Val Tyr Gly Gly Leu Ile Tyr Leu Ile
 1425 1430 1435 1440
 Asp Lys Leu Ser Val Ser Pro Pro Phe Leu Ser Leu Thr Arg Ser Gly
 1445 1450 1455
 Pro Ile Arg Asp Glu Leu Glu Thr Ile Pro His Lys Ile Pro Thr Ser
 1460 1465 1470
 Tyr Pro Thr Ser Asn Arg Asp Met Gly Val Ile Val Arg Asn Tyr Phe
 1475 1480 1485
 Lys Tyr Gln Cys Arg Leu Ile Glu Lys Gly Lys Tyr Arg Ser His Tyr
 1490 1495 1500

Ser Gln Leu Trp Leu Phe Ser Asp Val Leu Ser Ile Asp Phe Ile Gly
 1505 1510 1515 1520
 Pro Phe Ser Ile Ser Thr Thr Leu Leu Gln Ile Leu Tyr Lys Pro Phe
 1525 1530 1535
 Leu Ser Gly Lys Asp Lys Asn Glu Leu Arg Glu Leu Ala Asn Leu Ser
 1540 1545 1550
 Ser Leu Leu Arg Ser Gly Glu Gly Trp Glu Asp Ile His Val Lys Phe
 1555 1560 1565
 Phe Thr Lys Asp Ile Leu Leu Cys Pro Glu Glu Ile Arg His Ala Cys
 1570 1575 1580
 Lys Phe Gly Ile Ala Lys Asp Asn Asn Lys Asp Met Ser Tyr Pro Pro
 1585 1590 1595 1600
 Trp Gly Arg Glu Ser Arg Gly Thr Ile Thr Thr Ile Pro Val Tyr Tyr
 1605 1610 1615
 Thr Thr Thr Pro Tyr Pro Lys Met Leu Glu Met Pro Pro Arg Ile Gln
 1620 1625 1630
 Asn Pro Leu Leu Ser Gly Ile Arg Leu Gly Gln Leu Pro Thr Gly Ala
 1635 1640 1645
 His Tyr Lys Ile Arg Ser Ile Leu His Gly Met Gly Ile His Tyr Arg
 1650 1655 1660
 Asp Phe Leu Ser Cys Gly Asp Gly Ser Gly Gly Met Thr Ala Ala Leu
 1665 1670 1675 1680
 Leu Arg Glu Asn Val His Ser Arg Gly Ile Phe Asn Ser Leu Leu Glu
 1685 1690 1695
 Leu Ser Gly Ser Val Met Arg Gly Ala Ser Pro Glu Pro Pro Ser Ala
 1700 1705 1710
 Leu Glu Thr Leu Gly Gly Asp Lys Ser Arg Cys Val Asn Gly Glu Thr
 1715 1720 1725
 Cys Trp Glu Tyr Pro Ser Asp Leu Cys Asp Pro Arg Thr Trp Asp Tyr
 1730 1735 1740
 Phe Leu Arg Leu Lys Ala Gly Leu Gly Leu Gln Ile Asp Leu Ile Val
 1745 1750 1755 1760
 Met Asp Met Glu Val Arg Asp Ser Ser Thr Ser Leu Lys Ile Glu Thr
 1765 1770 1775
 Asn Val Arg Asn Tyr Val His Arg Ile Leu Asp Glu Gln Gly Val Leu
 1780 1785 1790
 Ile Tyr Lys Thr Tyr Gly Thr Tyr Ile Cys Glu Ser Glu Lys Asn Ala
 1795 1800 1805

Val Thr Ile Leu Gly Pro Met Phe Lys Thr Val Asp Leu Val Gln Thr
 1810 1815 1820
 Glu Phe Ser Ser Ser Gln Thr Ser Glu Val Tyr Met Val Cys Lys Gly
 1825 1830 1835 1840
 Leu Lys Lys Leu Ile Asp Glu Pro Asn Pro Asp Trp Ser Ser Ile Asn
 1845 1850 1855
 Glu Ser Trp Lys Asn Leu Tyr Ala Phe Gln Ser Ser Glu Gln Glu Phe
 1860 1865 1870
 Ala Arg Ala Lys Lys Val Ser Thr Tyr Phe Thr Leu Thr Gly Ile Pro
 1875 1880 1885
 Ser Gln Phe Ile Pro Asp Pro Phe Val Asn Ile Glu Thr Met Leu Gln
 1890 1895 1900
 Ile Phe Gly Val Pro Thr Gly Val Ser His Ala Ala Ala Leu Lys Ser
 1905 1910 1915 1920
 Ser Asp Arg Pro Ala Asp Leu Leu Thr Ile Ser Leu Phe Tyr Met Ala
 1925 1930 1935
 Ile Ile Ser Tyr Tyr Asn Ile Asn His Ile Arg Val Gly Pro Ile Pro
 1940 1945 1950
 Pro Asn Pro Pro Ser Asp Gly Ile Ala Gln Asn Val Gly Ile Ala Ile
 1955 1960 1965
 Thr Gly Ile Ser Phe Trp Leu Ser Leu Met Glu Lys Asp Ile Pro Leu
 1970 1975 1980
 Tyr Gln Gln Cys Leu Ala Val Ile Gln Gln Ser Phe Pro Ile Arg Trp
 1985 1990 1995 2000
 Glu Ala Val Ser Val Lys Gly Gly Tyr Lys Gln Lys Trp Ser Thr Arg
 2005 2010 2015
 Gly Asp Gly Leu Pro Lys Asp Thr Arg Thr Ser Asp Ser Leu Ala Pro
 2020 2025 2030
 Ile Gly Asn Trp Ile Arg Ser Leu Glu Leu Val Arg Asn Gln Val Arg
 2035 2040 2045
 Leu Asn Pro Phe Asn Glu Ile Leu Phe Asn Gln Leu Cys Arg Thr Val
 2050 2055 2060
 Asp Asn His Leu Lys Trp Ser Asn Leu Arg Arg Asn Thr Gly Met Ile
 2065 2070 2075 2080
 Glu Trp Ile Asn Arg Arg Ile Ser Lys Glu Asp Arg Ser Ile Leu Met
 2085 2090 2095
 Leu Lys Ser Asp Leu His Glu Glu Asn Ser Trp Arg Asp
 2100 2105

<210> 51
 <211> 1753
 <212> PRT
 <213> Vesicular stomatitis virus

<220>
 <221> MOD_RES
 <222> (1)..(1753)
 <223> "Xaa" represents any, other or unknown amino acid

<400> 51
 His Trp Gly His Pro Phe Ile Asp Tyr Tyr Ala Gly Leu Glu Lys Leu
 1 5 10 15
 His Ser Gln Val Thr Xaa Lys Lys Asp Ile Asp Val Ser Tyr Ala Lys
 20 25 30
 Ala Leu Ala Ser Asp Leu Ala Arg Ile Val Leu Phe Gln Gln Phe Asn
 35 40 45
 Asp His Xaa Lys Trp Phe Val Asn Gly Asp Leu Leu Pro His Asp His
 50 55 60
 Pro Phe Lys Ser His Val Lys Glu Asn Thr Trp Pro Thr Ala Ala Gln
 65 70 75 80
 Val Gln Asp Phe Gly Asp Lys Trp His Glu Leu Pro Leu Ile Lys Cys
 85 90 95
 Phe Glu Ile Pro Asp Leu Leu Asp Pro Ser Ile Ile Tyr Ser Asp Lys
 100 105 110
 Ser His Ser Met Asn Arg Ser Glu Val Leu Lys His Val Arg Met Asn
 115 120 125
 Pro Asn Thr Pro Ile Pro Ser Lys Lys Val Leu / Gln Thr Met Leu Asp
 130 135 140
 Thr Lys Ala Thr Asn Trp Lys Glu Phe Leu Lys Glu Ile Asp Glu Lys
 145 150 155 160
 Gly Leu Asp Asp Asp Asp Leu Ile Ile Gly Leu Lys Gly Lys Glu Arg
 165 170 175
 Glu Leu Lys Leu Ala Gly Arg Phe Phe Ser Leu Met Ser Trp Lys Leu
 180 185 190
 Arg Glu Tyr Phe Val Ile Thr Glu Tyr Leu Ile Lys Thr His Phe Val
 195 200 205
 Pro Met Phe Lys Gly Leu Thr Met Ala Asp Asp Leu Thr Ala Val Ile
 210 215 220
 Lys Lys Met Leu Asp Ser Ser Ser Gly Gln Gly Leu Lys Ser Tyr Glu
 225 230 235 240

Ala	Ile	Cys	Ile	Ala	Asn	His	Ile	Asp	Tyr	Glu	Lys	Trp	Asn	Asn	His	
				245					250					255		
Gln	Arg	Lys	Leu	Ser	Asn	Gly	Pro	Val	Phe	Arg	Val	Met	Gly	Gln	Phe	
			260					265					270			
Leu	Gly	Tyr	Pro	Ser	Leu	Ile	Glu	Arg	Thr	His	Glu	Phe	Phe	Glu	Lys	
		275					280					285				
Ser	Leu	Ile	Tyr	Tyr	Asn	Gly	Arg	Pro	Asp	Leu	Met	Arg	Val	His	Asn	
	290					295					300					
Asn	Thr	Leu	Ile	Asn	Ser	Thr	Ser	Gln	Arg	Val	Cys	Trp	Gln	Gly	Gln	
305					310					315					320	
Glu	Gly	Gly	Leu	Glu	Gly	Leu	Arg	Gln	Lys	Gly	Trp	Ser	Ile	Leu	Asn	
				325					330					335		
Leu	Leu	Val	Ile	Gln	Arg	Glu	Ala	Lys	Ile	Arg	Asn	Thr	Ala	Val	Lys	
			340					345					350			
Val	Leu	Ala	Gln	Gly	Asp	Asn	Gln	Val	Ile	Cys	Thr	Gln	Tyr	Lys	Thr	
		355					360					365				
Lys	Lys	Ser	Arg	Asn	Val	Val	Glu	Leu	Gln	Gly	Ala	Leu	Asn	Gln	Met	
	370					375					380					
Val	Ser	Asn	Asn	Glu	Lys	Ile	Met	Thr	Ala	Ile	Lys	Ile	Gly	Thr	Gly	
385					390					395					400	
Lys	Leu	Gly	Leu	Leu	Ile	Asn	Asp	Asp	Glu	Thr	Met	Gln	Ser	Ala	Asp	
				405					410					415		
Tyr	Leu	Asn	Tyr	Gly	Lys	Ile	Pro	Ile	Phe	Arg	Gly	Val	Ile	Arg	Gly	
		420						425					430			
Leu	Glu	Thr	Lys	Arg	Trp	Ser	Arg	Val	Thr	Cys	Val	Thr	Asn	Asp	Gln	
		435					440					445				
Ile	Pro	Thr	Cys	Ala	Asn	Ile	Met	Ser	Ser	Val	Ser	Thr	Asn	Ala	Leu	
	450					455					460					
Thr	Val	Ala	His	Phe	Ala	Glu	Asn	Pro	Ile	Asn	Ala	Met	Ile	Gln	Tyr	
465					470					475					480	
Asn	Tyr	Phe	Gly	Thr	Phe	Ala	Arg	Leu	Leu	Leu	Met	Met	His	Asp	Pro	
				485					490					495		
Ala	Leu	Arg	Gln	Ser	Leu	Tyr	Glu	Val	Gln	Asp	Lys	Ile	Pro	Gly	Leu	
			500					505					510			
His	Ser	Ser	Thr	Phe	Lys	Tyr	Ala	Met	Leu	Tyr	Leu	Asp	Pro	Ser	Ile	
		515					520					525				
Gly	Gly	Val	Ser	Gly	Met	Ser	Leu	Ser	Arg	Phe	Leu	Ile	Arg	Ala	Phe	
	530					535					540					

Pro	Asp	Pro	Val	Thr	Glu	Ser	Leu	Ser	Phe	Trp	Arg	Phe	Ile	His	Val	
545					550					555					560	
His	Ala	Arg	Ser	Glu	His	Leu	Lys	Glu	Met	Ser	Ala	Val	Phe	Gly	Asn	
				565					570					575		
Pro	Glu	Ile	Ala	Lys	Phe	Arg	Ile	Thr	His	Ile	Asp	Lys	Leu	Val	Glu	
			580					585					590			
Asp	Pro	Thr	Ser	Leu	Asn	Ile	Ala	Met	Gly	Met	Ser	Pro	Ala	Asn	Leu	
		595					600					605				
Leu	Lys	Thr	Glu	Val	Lys	Lys	Cys	Leu	Ile	Glu	Ser	Arg	Gln	Thr	Ile	
	610					615					620					
Arg	Asn	Gln	Val	Ile	Lys	Asp	Ala	Thr	Ile	Tyr	Leu	Tyr	His	Glu	Glu	
625					630					635					640	
Asp	Arg	Leu	Arg	Ser	Phe	Leu	Trp	Ser	Ile	Asn	Pro	Leu	Phe	Pro	Arg	
				645					650					655		
Phe	Leu	Ser	Glu	Phe	Lys	Ser	Gly	Thr	Phe	Leu	Gly	Val	Ala	Asp	Gly	
			660					665					670			
Leu	Ile	Ser	Leu	Phe	Gln	Asn	Ser	Arg	Thr	Ile	Arg	Asn	Ser	Phe	Lys	
		675					680					685				
Lys	Lys	Tyr	His	Arg	Glu	Leu	Asp	Asp	Leu	Ile	Val	Arg	Ser	Glu	Val	
	690					695					700					
Ser	Ser	Leu	Thr	His	Leu	Gly	Lys	Leu	His	Leu	Arg	Arg	Gly	Ser	Cys	
705					710					715					720	
Lys	Met	Trp	Thr	Cys	Ser	Ala	Thr	His	Ala	Asp	Thr	Leu	Arg	Tyr	Lys	
				725					730					735		
Ser	Trp	Gly	Arg	Thr	Val	Ile	Gly	Thr	Thr	Val	Pro	His	Pro	Leu	Glu	
			740					745					750			
Met	Leu	Gly	Pro	Gln	His	Arg	Lys	Glu	Thr	Pro	Cys	Ala	Pro	Cys	Asn	
		755					760					765				
Thr	Ser	Gly	Phe	Asn	Tyr	Val	Ser	Val	His	Cys	Pro	Asp	Gly	Ile	His	
	770					775					780					
Asp	Val	Phe	Ser	Ser	Arg	Gly	Pro	Leu	Pro	Ala	Tyr	Leu	Gly	Ser	Lys	
785					790					795					800	
Thr	Ser	Glu	Ser	Thr	Ser	Ile	Leu	Gln	Pro	Trp	Glu	Arg	Glu	Ser	Lys	
				805					810					815		
Val	Pro	Leu	Ile	Lys	Arg	Ala	Thr	Arg	Leu	Arg	Asp	Ala	Ile	Ser	Trp	
			820					825					830			
Phe	Val	Glu	Pro	Asp	Ser	Lys	Leu	Ala	Met	Thr	Ile	Leu	Ser	Asn	Ile	
		835					840					845				

His	Ser	Leu	Thr	Gly	Glu	Glu	Trp	Thr	Lys	Arg	Gln	His	Gly	Phe	Lys	850	855	860
Arg	Thr	Gly	Ser	Ala	Leu	His	Arg	Phe	Ser	Thr	Ser	Arg	Met	Ser	His	865	870	875 880
Gly	Gly	Phe	Ala	Ser	Gln	Ser	Thr	Ala	Ala	Leu	Thr	Arg	Leu	Met	Ala	885	890	895
Thr	Thr	Asp	Thr	Met	Arg	Asp	Leu	Gly	Asp	Gln	Asn	Phe	Asp	Phe	Leu	900	905	910
Phe	Gln	Ala	Thr	Leu	Leu	Tyr	Ala	Gln	Ile	Thr	Thr	Thr	Val	Ala	Arg	915	920	925
Asp	Gly	Trp	Ile	Thr	Ser	Cys	Thr	Asp	His	Tyr	His	Ile	Ala	Cys	Lys	930	935	940
Ser	Cys	Leu	Arg	Pro	Ile	Glu	Glu	Ile	Thr	Leu	Asp	Ser	Ser	Met	Asp	945	950	955 960
Tyr	Thr	Pro	Pro	Asp	Val	Ser	His	Val	Leu	Lys	Thr	Trp	Arg	Asn	Gly	965	970	975
Glu	Gly	Ser	Trp	Gly	Gln	Glu	Ile	Lys	Gln	Ile	Tyr	Pro	Leu	Glu	Gly	980	985	990
Asn	Trp	Lys	Asn	Leu	Ala	Pro	Ala	Glu	Gln	Ser	Tyr	Gln	Val	Gly	Arg	995	1000	1005
Cys	Ile	Gly	Phe	Leu	Tyr	Gly	Asp	Leu	Ala	Tyr	Arg	Lys	Ser	Thr	His	1010	1015	1020
Ala	Glu	Asp	Ser	Ser	Leu	Phe	Pro	Leu	Ser	Ile	Gln	Gly	Arg	Ile	Arg	1025	1030	1035 1040
Gly	Arg	Gly	Phe	Leu	Lys	Gly	Leu	Leu	Asp	Gly	Leu	Met	Arg	Ala	Ser	1045	1050	1055
Cys	Cys	Gln	Val	Ile	His	Arg	Arg	Ser	Leu	Ala	His	Leu	Lys	Arg	Pro	1060	1065	1070
Ala	Asn	Ala	Val	Tyr	Gly	Gly	Leu	Ile	Tyr	Leu	Ile	Asp	Lys	Leu	Ser	1075	1080	1085
Val	Ser	Pro	Pro	Phe	Leu	Ser	Leu	Thr	Arg	Ser	Gly	Pro	Ile	Arg	Asp	1090	1095	1100
Glu	Leu	Glu	Thr	Ile	Pro	His	Lys	Ile	Pro	Thr	Ser	Tyr	Pro	Thr	Ser	1105	1110	1115 1120
Asn	Arg	Asp	Met	Gly	Val	Ile	Val	Arg	Asn	Tyr	Phe	Lys	Tyr	Gln	Cys	1125	1130	1135
Arg	Leu	Ile	Glu	Lys	Gly	Lys	Tyr	Arg	Ser	His	Tyr	Ser	Gln	Leu	Trp	1140	1145	1150

Leu Phe Ser Asp Val Leu Ser Ile Asp Phe Ile Gly Pro Phe Ser Ile
 1155 1160 1165

Ser Thr Thr Leu Leu Gln Ile Leu Tyr Lys Pro Phe Leu Ser Gly Lys
 1170 1175 1180

Asp Lys Asn Glu Leu Arg Glu Leu Ala Asn Leu Ser Ser Leu Leu Arg
 1185 1190 1195 1200

Ser Gly Glu Gly Trp Glu Asp Ile His Val Lys Phe Phe Thr Lys Asp
 1205 1210 1215

Ile Leu Leu Cys Pro Glu Glu Ile Arg His Ala Cys Lys Phe Gly Ile
 1220 1225 1230

Ala Lys Asp Asn Asn Lys Asp Met Ser Tyr Pro Pro Trp Gly Arg Glu
 1235 1240 1245

Ser Arg Gly Thr Ile Thr Thr Ile Pro Val Tyr Tyr Thr Thr Thr Pro
 1250 1255 1260

Tyr Pro Lys Met Leu Glu Met Pro Pro Arg Ile Gln Asn Pro Leu Leu
 1265 1270 1275 1280

Ser Gly Ile Arg Leu Gly Gln Leu Pro Thr Gly Ala His Tyr Lys Ile
 1285 1290 1295

Arg Ser Ile Leu His Gly Met Gly Ile His Tyr Arg Asp Phe Leu Ser
 1300 1305 1310

Cys Gly Asp Gly Ser Gly Gly Met Thr Ala Ala Leu Leu Arg Glu Asn
 1315 1320 1325

Val His Ser Arg Gly Ile Phe Asn Ser Leu Leu Glu Leu Ser Gly Ser
 1330 1335 1340

Val Met Arg Gly Ala Ser Pro Glu Pro Pro Ser Ala Leu Glu Thr Leu
 1345 1350 1355 1360

Gly Gly Asp Lys Ser Arg Cys Val Asn Gly Glu Thr Cys Trp Glu Tyr
 1365 1370 1375

Pro Ser Asp Leu Cys Asp Pro Arg Thr Trp Asp Tyr Phe Leu Arg Leu
 1380 1385 1390

Lys Ala Gly Leu Gly Leu Gln Ile Asp Leu Ile Val Met Asp Met Glu
 1395 1400 1405

Val Arg Asp Ser Ser Thr Ser Leu Lys Ile Glu Thr Asn Val Arg Asn
 1410 1415 1420

Tyr Val His Arg Ile Leu Asp Glu Gln Gly Val Leu Ile Tyr Lys Thr
 1425 1430 1435 1440

Tyr Gly Thr Tyr Ile Cys Glu Ser Glu Lys Asn Ala Val Thr Ile Leu
 1445 1450 1455

Gly Pro Met Phe Lys Thr Val Asp Leu Val Gln Thr Glu Phe Ser Ser
 1460 1465 1470
 Ser Gln Thr Ser Glu Val Tyr Met Val Cys Lys Gly Leu Lys Lys Leu
 1475 1480 1485
 Ile Asp Glu Pro Asn Pro Asp Trp Ser Ser Ile Asn Glu Ser Trp Lys
 1490 1495 1500
 Asn Leu Tyr Ala Phe Gln Ser Ser Glu Gln Glu Phe Ala Arg Ala Lys
 1505 1510 1515 1520
 Lys Val Ser Thr Tyr Phe Thr Leu Thr Gly Ile Pro Ser Gln Phe Ile
 1525 1530 1535
 Pro Asp Pro Phe Val Asn Ile Glu Thr Met Leu Gln Ile Phe Gly Val
 1540 1545 1550
 Pro Thr Gly Val Ser His Ala Ala Ala Leu Lys Ser Ser Asp Arg Pro
 1555 1560 1565
 Ala Asp Leu Leu Thr Ile Ser Leu Phe Tyr Met Ala Ile Ile Ser Tyr
 1570 1575 1580
 Tyr Asn Ile Asn His Ile Arg Val Gly Pro Ile Pro Pro Asn Pro Pro
 1585 1590 1595 1600
 Ser Asp Gly Ile Ala Gln Asn Val Gly Ile Ala Ile Thr Gly Ile Ser
 1605 1610 1615
 Phe Trp Leu Ser Leu Met Glu Lys Asp Ile Pro Leu Tyr Gln Gln Cys
 1620 1625 1630
 Leu Ala Val Ile Gln Gln Ser Phe Pro Ile Arg Trp Glu Ala Val Ser
 1635 1640 1645
 Val Lys Gly Gly Tyr Lys Gln Lys Trp Ser Thr Arg Gly Asp Gly Leu
 1650 1655 1660
 Pro Lys Asp Thr Arg Ile Ser Asp Ser Leu Ala Pro Ile Gly Asn Trp
 1665 1670 1675 1680
 Ile Arg Ser Leu Glu Leu Val Arg Asn Gln Val Arg Leu Asn Pro Phe
 1685 1690 1695
 Asn Glu Ile Leu Phe Asn Gln Leu Cys Arg Thr Val Asp Asn His Leu
 1700 1705 1710
 Lys Trp Ser Asn Leu Arg Lys Asn Thr Gly Met Ile Glu Trp Ile Asn
 1715 1720 1725
 Arg Arg Ile Ser Lys Glu Asp Arg Ser Ile Leu Met Leu Lys Ser Asp
 1730 1735 1740
 Leu His Glu Glu Asn Ser Trp Arg Asp
 1745 1750

<210> 52
<211> 2109
<212> PRT
<213> Vesicular stomatitis virus

<220>
<221> MOD_RES
<222> (1)..(2109)
<223> "Xaa" represents any, other or unknown amino acid

<400> 52

Met	Glu	Val	His	Asp	Phe	Glu	Thr	Asp	Glu	Phe	Asn	Asp	Phe	Asn	Glu	
1				5					10					15		
Asp	Asp	Tyr	Ala	Thr	Arg	Glu	Phe	Leu	Asn	Pro	Asp	Glu	Arg	Met	Thr	
			20					25					30			
Tyr	Leu	Asn	His	Ala	Asp	Tyr	Asn	Leu	Asn	Ser	Pro	Leu	Ile	Ser	Asp	
		35					40					45				
Asp	Ile	Asp	Asn	Leu	Ile	Arg	Lys	Phe	Asn	Ser	Leu	Pro	Ile	Pro	Ser	
	50					55					60					
Met	Trp	Asp	Ser	Lys	Asn	Trp	Asp	Gly	Val	Leu	Glu	Met	Leu	Thr	Ser	
65					70					75					80	
Cys	Gln	Ala	Asn	Pro	Ile	Ser	Thr	Ser	Gln	Met	His	Lys	Trp	Met	Gly	
				85					90					95		
Ser	Trp	Leu	Met	Ser	Asp	Asn	His	Asp	Ala	Ser	Gln	Gly	Tyr	Ser	Phe	
		100						105					110			
Leu	His	Glu	Val	Asp	Lys	Glu	Ala	Glu	Ile	Thr	Phe	Asp	Val	Val	Glu	
		115					120					125				
Thr	Phe	Ile	Arg	Gly	Trp	Gly	Asn	Lys	Pro	Ile	Glu	Tyr	Ile	Lys	Lys	
	130					135					140					
Glu	Arg	Trp	Thr	Asp	Ser	Phe	Lys	Ile	Leu	Ala	Tyr	Leu	Cys	Gln	Lys	
145					150					155					160	
Phe	Leu	Asp	Leu	His	Lys	Leu	Thr	Leu	Ile	Leu	Asn	Ala	Val	Ser	Glu	
			165						170					175		
Val	Glu	Leu	Leu	Asn	Leu	Ala	Arg	Thr	Phe	Lys	Gly	Lys	Val	Arg	Arg	
		180						185					190			
Ser	Ser	His	Gly	Thr	Asn	Ile	Cys	Arg	Leu	Arg	Val	Pro	Ser	Leu	Gly	
		195					200					205				
Pro	Thr	Phe	Ile	Ser	Glu	Gly	Trp	Ala	Tyr	Phe	Lys	Lys	Leu	Asp	Ile	
	210					215					220					
Leu	Met	Asp	Arg	Asn	Phe	Leu	Leu	Met	Val	Lys	Asp	Val	Ile	Ile	Gly	
225					230					235					240	

Arg	Met	Gln	Thr	Val	Leu	Ser	Met	Val	Cys	Arg	Ile	Asp	Asn	Leu	Phe	245	250	255
Ser	Glu	Gln	Asp	Ile	Phe	Ser	Leu	Leu	Asn	Ile	Tyr	Arg	Ile	Gly	Asp	260	265	270
Lys	Ile	Val	Glu	Arg	Gln	Gly	Asn	Phe	Ser	Tyr	Asp	Leu	Ile	Lys	Met	275	280	285
Val	Glu	Pro	Ile	Cys	Asn	Leu	Arg	Leu	Met	Lys	Leu	Ala	Arg	Glu	Ser	290	295	300
Arg	Pro	Leu	Val	Pro	Gln	Phe	Pro	His	Phe	Glu	Asn	His	Ile	Lys	Thr	305	310	315
Ser	Val	Asp	Glu	Gly	Ala	Lys	Ile	Asp	Arg	Gly	Ile	Arg	Phe	Leu	His	325	330	335
Asp	Gln	Ile	Met	Ser	Val	Lys	Thr	Val	Asp	Leu	Thr	Leu	Val	Ile	Tyr	340	345	350
Gly	Ser	Phe	Arg	His	Trp	Gly	His	Pro	Phe	Ile	Asp	Tyr	Tyr	Ala	Gly	355	360	365
Leu	Glu	Lys	Leu	His	Ser	Gln	Val	Thr	Met	Lys	Lys	Asp	Ile	Asp	Val	370	375	380
Ser	Tyr	Ala	Lys	Ala	Leu	Ala	Ser	Asp	Leu	Ala	Arg	Ile	Val	Leu	Phe	385	390	395
Gln	Gln	Phe	Asn	Asp	His	Lys	Lys	Trp	Phe	Val	Asn	Gly	Asp	Leu	Leu	405	410	415
Pro	His	Asp	His	Pro	Phe	Lys	Ser	His	Val	Lys	Glu	Asn	Thr	Trp	Pro	420	425	430
Thr	Ala	Ala	Gln	Val	Gln	Asp	Phe	Gly	Asp	Lys	Trp	His	Glu	Leu	Pro	435	440	445
Leu	Ile	Lys	Cys	Phe	Glu	Ile	Pro	Asp	Leu	Leu	Asp	Pro	Ser	Ile	Ile	450	455	460
Tyr	Ser	Asp	Lys	Ser	His	Ser	Met	Asn	Arg	Ser	Glu	Val	Leu	Lys	His	465	470	475
Val	Arg	Met	Asn	Pro	Asn	Thr	Pro	Ile	Pro	Ser	Lys	Lys	Val	Leu	Gln	485	490	495
Thr	Met	Leu	Asp	Thr	Lys	Ala	Thr	Asn	Trp	Lys	Glu	Phe	Leu	Lys	Glu	500	505	510
Ile	Asp	Glu	Lys	Gly	Leu	Asp	Asp	Asp	Asp	Leu	Ile	Ile	Gly	Leu	Lys	515	520	525
Gly	Lys	Glu	Arg	Glu	Leu	Lys	Leu	Ala	Gly	Arg	Phe	Phe	Ser	Leu	Met	530	535	540

Ser Trp Lys Leu Arg Glu Tyr Phe Val Ile Thr Glu Tyr Leu Ile Lys
 545 550 555 560
 Thr His Phe Val Pro Met Phe Lys Gly Leu Thr Met Ala Asp Asp Leu
 565 570 575
 Thr Ala Val Ile Lys Lys Met Leu Asp Ser Ser Ser Gly Gln Gly Leu
 580 585 590
 Lys Ser Tyr Glu Ala Ile Cys Ile Ala Asn His Ile Asp Tyr Glu Lys
 595 600 605
 Trp Asn Asn His Gln Arg Lys Leu Ser Asn Gly Pro Val Phe Arg Val
 610 615 620
 Met Gly Gln Phe Leu Gly Tyr Pro Ser Leu Ile Glu Arg Thr His Glu
 625 630 635 640
 Phe Phe Glu Lys Ser Leu Ile Tyr Tyr Asn Gly Arg Pro Asp Leu Met
 645 650 655
 Arg Val His Asn Asn Thr Leu Ile Asn Ser Thr Ser Gln Arg Val Cys
 660 665 670
 Trp Gln Gly Gln Glu Gly Gly Leu Glu Gly Leu Arg Gln Lys Gly Trp
 675 680 685
 Ser Ile Leu Asn Leu Leu Val Ile Gln Arg Glu Ala Lys Ile Arg Asn
 690 695 700
 Thr Ala Val Lys Val Leu Ala Gln Gly Asp Asn Gln Val Ile Cys Thr
 705 710 715 720
 Gln Tyr Lys Thr Lys Lys Ser Arg Asn Val Val Glu Leu Gln Gly Ala
 725 730 735
 Leu Asn Gln Met Val Ser Asn Asn Glu Lys Ile Met Thr Ala Ile Lys
 740 745 750
 Ile Gly Thr Gly Lys Leu Gly Leu Leu Ile Asn Asp Asp Glu Thr Met
 755 760 765
 Gln Ser Ala Asp Tyr Leu Asn Tyr Gly Lys Ile Pro Ile Phe Arg Gly
 770 775 780
 Val Ile Arg Gly Leu Glu Thr Lys Arg Trp Ser Arg Val Thr Cys Val
 785 790 795 800
 Thr Asn Asp Gln Ile Pro Thr Cys Ala Asn Ile Met Ser Ser Val Ser
 805 810 815
 Thr Asn Ala Leu Thr Val Ala His Phe Ala Glu Asn Pro Ile Asn Ala
 820 825 830
 Met Ile Gln Tyr Asn Tyr Phe Gly Thr Phe Ala Arg Leu Leu Leu Met
 835 840 845

Met	His	Asp	Pro	Ala	Leu	Arg	Gln	Ser	Leu	Tyr	Glu	Val	Gln	Asp	Lys	850	855	860	
Ile	Pro	Gly	Leu	His	Ser	Ser	Thr	Phe	Lys	Tyr	Ala	Met	Leu	Tyr	Leu	865	870	875	880
Asp	Pro	Ser	Ile	Gly	Gly	Val	Ser	Gly	Met	Ser	Leu	Ser	Arg	Phe	Leu	885	890	895	
Ile	Arg	Ala	Phe	Pro	Asp	Pro	Val	Thr	Glu	Ser	Leu	Ser	Phe	Trp	Arg	900	905	910	
Phe	Ile	His	Val	His	Ala	Arg	Ser	Glu	His	Leu	Lys	Glu	Met	Ser	Ala	915	920	925	
Val	Phe	Gly	Asn	Pro	Glu	Ile	Ala	Lys	Phe	Arg	Ile	Thr	His	Ile	Asp	930	935	940	
Lys	Leu	Val	Glu	Asp	Pro	Thr	Ser	Leu	Asn	Ile	Ala	Met	Gly	Met	Ser	945	950	955	960
Pro	Ala	Asn	Leu	Leu	Lys	Thr	Glu	Val	Lys	Lys	Cys	Leu	Ile	Glu	Ser	965	970	975	
Arg	Gln	Thr	Ile	Arg	Asn	Gln	Val	Ile	Lys	Asp	Ala	Thr	Ile	Tyr	Leu	980	985	990	
Tyr	His	Glu	Glu	Asp	Arg	Leu	Arg	Ser	Phe	Leu	Trp	Ser	Ile	Asn	Pro	995	1000	1005	
Leu	Phe	Pro	Arg	Phe	Leu	Ser	Glu	Phe	Lys	Ser	Gly	Thr	Phe	Leu	Gly	1010	1015	1020	
Val	Ala	Asp	Gly	Leu	Ile	Ser	Leu	Phe	Gln	Asn	Ser	Arg	Thr	Ile	Arg	1025	1030	1035	1040
Asn	Ser	Phe	Lys	Lys	Lys	Tyr	His	Arg	Glu	Leu	Asp	Asp	Leu	Ile	Val	1045	1050	1055	
Arg	Ser	Glu	Val	Ser	Ser	Leu	Thr	His	Leu	Gly	Lys	Leu	His	Leu	Arg	1060	1065	1070	
Arg	Gly	Ser	Cys	Lys	Met	Trp	Thr	Cys	Ser	Ala	Thr	His	Ala	Asp	Thr	1075	1080	1085	
Leu	Arg	Tyr	Lys	Ser	Trp	Gly	Arg	Thr	Val	Ile	Gly	Thr	Thr	Val	Pro	1090	1095	1100	
His	Pro	Leu	Glu	Met	Leu	Gly	Pro	Gln	His	Arg	Lys	Glu	Thr	Pro	Cys	1105	1110	1115	1120
Ala	Pro	Cys	Asn	Thr	Ser	Gly	Phe	Asn	Tyr	Val	Ser	Val	His	Cys	Pro	1125	1130	1135	
Asp	Gly	Ile	His	Asp	Val	Phe	Ser	Ser	Arg	Gly	Pro	Leu	Pro	Ala	Tyr	1140	1145	1150	

Leu Gly Ser Lys Thr Ser Glu Ser Thr Ser Ile Leu Gln Pro Trp Glu
 1155 1160 1165

Arg Glu Ser Lys Val Pro Leu Ile Lys Arg Ala Thr Arg Leu Arg Asp
 1170 1175 1180

Ala Ile Ser Trp Phe Val Glu Pro Asp Ser Lys Leu Ala Met Thr Ile
 1185 1190 1195 1200

Leu Ser Asn Ile His Ser Leu Thr Gly Glu Glu Trp Thr Lys Arg Gln
 1205 1210 1215

His Gly Phe Lys Arg Thr Gly Ser Ala Leu His Arg Phe Ser Thr Ser
 1220 1225 1230

Arg Met Ser His Gly Gly Phe Ala Ser Gln Ser Thr Ala Ala Leu Thr
 1235 1240 1245

Arg Leu Met Ala Thr Thr Asp Thr Met Arg Asp Leu Gly Asp Gln Asn
 1250 1255 1260

Phe Asp Phe Leu Phe Xaa Ala Thr Leu Leu Tyr Ala Xaa Ile Thr Thr
 1265 1270 1275 1280

Thr Val Ala Arg Asp Gly Trp Ile Thr Ser Cys Thr Asp His Tyr His
 1285 1290 1295

Ile Ala Cys Lys Ser Cys Leu Arg Pro Ile Glu Glu Ile Thr Leu Asp
 1300 1305 1310

Ser Ser Met Asp Tyr Thr Pro Pro Asp Val Ser His Val Leu Lys Thr
 1315 1320 1325

Trp Arg Asn Gly Glu Gly Ser Trp Gly Gln Glu Ile Lys Gln Ile Tyr
 1330 1335 1340

Pro Leu Glu Gly Asn Trp Lys Asn Leu Ala Pro Ala Glu Gln Ser Tyr
 1345 1350 1355 1360

Gln Val Gly Arg Cys Ile Gly Phe Leu Tyr Gly Asp Leu Ala Tyr Arg
 1365 1370 1375

Lys Ser Thr His Ala Glu Asp Ser Ser Leu Phe Pro Leu Ser Ile Gln
 1380 1385 1390

Gly Arg Ile Arg Gly Arg Gly Phe Leu Lys Gly Leu Leu Asp Gly Leu
 1395 1400 1405

Met Arg Ala Ser Cys Cys Gln Val Ile His Arg Arg Ser Leu Ala His
 1410 1415 1420

Leu Lys Arg Pro Ala Asn Ala Val Tyr Gly Gly Leu Ile Tyr Leu Ile
 1425 1430 1435 1440

Asp Lys Leu Ser Val Ser Pro Pro Phe Leu Ser Leu Thr Arg Ser Gly
 1445 1450 1455

Pro Ile Arg Asp Glu Leu Glu Thr Ile Pro His Lys Ile Pro Thr Ser
 1460 1465 1470
 Tyr Pro Thr Ser Asn Arg Asp Met Gly Val Ile Val Arg Asn Tyr Phe
 1475 1480 1485
 Lys Tyr Gln Cys Arg Leu Ile Glu Lys Gly Lys Tyr Arg Ser His Tyr
 1490 1495 1500
 Ser Gln Leu Trp Leu Phe Ser Asp Val Leu Ser Ile Asp Phe Ile Gly
 1505 1510 1515 1520
 Pro Phe Ser Ile Ser Thr Thr Leu Leu Gln Ile Leu Tyr Lys Pro Phe
 1525 1530 1535
 Leu Ser Gly Lys Asp Lys Asn Glu Leu Arg Glu Leu Ala Asn Leu Ser
 1540 1545 1550
 Ser Leu Leu Arg Ser Gly Glu Gly Trp Glu Asp Ile His Val Lys Phe
 1555 1560 1565
 Phe Thr Lys Asp Ile Leu Leu Cys Pro Glu Glu Ile Arg His Ala Cys
 1570 1575 1580
 Lys Phe Gly Ile Ala Lys Asp Asn Asn Lys Asp Met Ser Tyr Pro Pro
 1585 1590 1595 1600
 Trp Gly Arg Glu Ser Arg Gly Thr Ile Thr Thr Ile Pro Val Tyr Tyr
 1605 1610 1615
 Thr Thr Thr Pro Tyr Pro Lys Met Leu Glu Met Pro Pro Arg Ile Gln
 1620 1625 1630
 Asn Pro Leu Leu Ser Gly Ile Arg Leu Gly Gln Leu Pro Thr Gly Ala
 1635 1640 1645
 His Tyr Lys Ile Arg Ser Ile Leu His Gly Met Gly Ile His Tyr Arg
 1650 1655 1660
 Asp Phe Leu Ser Cys Gly Asp Gly Ser Gly Gly Met Thr Ala Ala Leu
 1665 1670 1675 1680
 Leu Arg Glu Asn Val His Ser Arg Gly Ile Phe Asn Ser Leu Leu Glu
 1685 1690 1695
 Leu Ser Gly Ser Val Met Arg Gly Ala Ser Pro Glu Pro Pro Ser Ala
 1700 1705 1710
 Leu Glu Thr Leu Gly Gly Asp Lys Ser Arg Cys Val Asn Gly Glu Thr
 1715 1720 1725
 Cys Trp Glu Tyr Pro Ser Asp Leu Cys Asp Pro Arg Thr Trp Asp Tyr
 1730 1735 1740
 Phe Leu Arg Leu Lys Ala Gly Leu Gly Leu Gln Ile Asp Leu Ile Val
 1745 1750 1755 1760

Met	Asp	Met	Glu	Val	Arg	Asp	Ser	Ser	Thr	Ser	Leu	Lys	Ile	Glu	Thr	1765	1770	1775	
Asn	Val	Arg	Asn	Tyr	Val	His	Arg	Ile	Leu	Asp	Glu	Gln	Gly	Val	Leu	1780	1785	1790	
Ile	Tyr	Lys	Thr	Tyr	Gly	Thr	Tyr	Ile	Cys	Glu	Ser	Glu	Lys	Asn	Ala	1795	1800	1805	
Val	Thr	Ile	Leu	Gly	Pro	Met	Phe	Lys	Thr	Val	Asp	Leu	Val	Gln	Thr	1810	1815	1820	
Glu	Phe	Ser	Ser	Ser	Gln	Thr	Ser	Glu	Val	Tyr	Met	Val	Cys	Lys	Gly	1825	1830	1835	1840
Leu	Lys	Lys	Leu	Ile	Asp	Glu	Pro	Asn	Pro	Asp	Trp	Ser	Ser	Ile	Asn	1845	1850	1855	
Glu	Ser	Trp	Lys	Asn	Leu	Tyr	Ala	Phe	Gln	Ser	Ser	Glu	Gln	Glu	Phe	1860	1865	1870	
Ala	Arg	Ala	Lys	Lys	Val	Ser	Thr	Tyr	Phe	Thr	Leu	Thr	Gly	Ile	Pro	1875	1880	1885	
Ser	Gln	Phe	Ile	Pro	Asp	Pro	Phe	Val	Asn	Ile	Glu	Thr	Met	Leu	Gln	1890	1895	1900	
Ile	Phe	Gly	Val	Pro	Thr	Gly	Val	Ser	His	Ala	Ala	Ala	Leu	Lys	Ser	1905	1910	1915	1920
Ser	Asp	Arg	Pro	Ala	Asp	Leu	Leu	Thr	Ile	Ser	Leu	Phe	Tyr	Met	Ala	1925	1930	1935	
Ile	Ile	Ser	Tyr	Tyr	Asn	Ile	Asn	His	Ile	Arg	Val	Gly	Pro	Ile	Pro	1940	1945	1950	
Pro	Asn	Pro	Pro	Ser	Asp	Gly	Ile	Ala	Gln	Asn	Val	Gly	Ile	Ala	Ile	1955	1960	1965	
Thr	Gly	Ile	Ser	Phe	Trp	Leu	Ser	Leu	Met	Glu	Lys	Asp	Ile	Pro	Leu	1970	1975	1980	
Tyr	Gln	Gln	Cys	Leu	Ala	Val	Ile	Gln	Gln	Ser	Phe	Pro	Ile	Arg	Trp	1985	1990	1995	2000
Glu	Ala	Val	Ser	Val	Lys	Gly	Gly	Tyr	Lys	Gln	Lys	Trp	Ser	Thr	Arg	2005	2010	2015	
Gly	Asp	Gly	Leu	Pro	Lys	Asp	Thr	Arg	Ile	Ser	Asp	Ser	Leu	Ala	Pro	2020	2025	2030	
Ile	Gly	Asn	Trp	Ile	Arg	Ser	Leu	Glu	Leu	Val	Arg	Asn	Gln	Val	Arg	2035	2040	2045	
Leu	Asn	Pro	Phe	Asn	Glu	Ile	Leu	Phe	Asn	Gln	Leu	Cys	Arg	Thr	Val	2050	2055	2060	

Asp Asn His Leu Lys Trp Ser Asn Leu Arg Lys Asn Thr Gly Met Ile
2065 2070 2075 2080

Glu Trp Ile Asn Arg Arg Ile Ser Lys Glu Asp Arg Ser Ile Leu Met
2085 2090 2095

Leu Lys Ser Asp Leu His Glu Glu Asn Ser Trp Arg Asp
2100 2105